Affymetrix®

User Manual

GeneTitan® Instrument User Guide for Expression Array Plates

P/N 702933 Rev. 1

For research use only.
Not for use in diagnostic procedures.

Trademarks

Affymetrix®, Axiom™, Command Console®, DMET™, GeneAtlas™, GeneChip®, GeneChip-compatible™, GeneTitan®, Genotyping Console™, NetAffx®, and Powered by Affymetrix™ are trademarks or registered trademarks of Affymetrix Inc. All other trademarks are the property of their respective owners.

Limited License

Subject to the Affymetrix terms and conditions that govern your use of Affymetrix products, Affymetrix grants you a non-exclusive, non-transferable, non-sublicensable license to use this Affymetrix product only in accordance with the manual and written instructions provided by Affymetrix. You understand and agree that except as expressly set forth in the Affymetrix terms and conditions, that no right or license to any patent or other intellectual property owned or licensable by Affymetrix is conveyed or implied by this Affymetrix product. In particular, no right or license is conveyed or implied to use this Affymetrix product in combination with a product not provided, licensed or specifically recommended by Affymetrix for such use.

Patents

Arrays: Products may be covered by one or more of the following patents: U.S. Patent Nos. 5,445,934; 5,744,305; 6,399,365; 6,733,977; and other U.S. or foreign patents. Products are manufactured and sold under license from OGT under 5,700,637 and 6,054,270.

Scanner: Products may be covered by one or more of the following patents: U.S. Patent Nos. 6,141,096, 6,262,838; 6,294,327; 6,403,320; 6,407,858; 6,597,000; 7,406,391 and other U.S. or foreign patents.

Software: Products may be covered by one or more of the following patents: Products may be protected by one or more of the following patents: U.S. Patent Nos. 6,090,555; 6,611,767; 6,687,692; 6,829,376; 7,130,458; 7,451,047 and other U.S. or foreign patents.

Copyright

©2010 Affymetrix Inc. All rights reserved.

Contents

Chapter 1 Before Using the GeneTitan® Instrument 1

Equipment, Reagents and Consumables Required 1
Proper Installation of the GeneTitan Tray Consumables 4
Proper Tray Alignment and Loading 5
Correct Placement of Stain Trays and Covers 7
Labeling GeneTitan Reagent Trays 8
Anti-Static Procedure for GeneTitan Instrument Trays and Covers 9
Testing the Anti-Static Gun 10
Deionization Procedure 10
E-mail and Telephone Notifications from the GeneTitan Instrument 11

Chapter 2 Starting the GeneTitan® Instrument and AGCC. 13

Starting Command Console Launcher and the GeneTitan Instrument Control Software . . . 13
Setup Options for Array Plate Processing 16
Hyb-Wash-Scan 16
Hyb-Wash 17
Wash-Scan 17
Scan 17
Unload Plates 17
Wash-Scan-Resume 17

Chapter 3 Hyb-Wash-Scan Workflow. 19

Hybridization Buffer, Stains, and Wash Buffer Volumes Required for the GeneTitan® Instrument 19
Loading the Instrument for Hyb-Wash-Scan Workflow 20
Loading Plates and Trays into the GeneTitan Instrument 24
Running Multiple Workflows at the Same Time for Expression Arrays 34
Running the Hyb-Wash-Scan Workflow on a Series of Array Plates 35

Chapter 4 Wash-Scan Workflow 37

Loading Instrument for Wash-Scan Workflow 37

Chapter 5 Scan Workflow. 47

Loading Instrument for Imaging Workflow 47
Running Multiple Workflows at the Same Time for Expression Arrays 51
Running the Scan Workflow with Other Workflows 52

Appendix A GeneTitan® Instrument Care and Troubleshooting 53

GeneTitan® Instrument Care 53
Cleaning and Maintenance 53
Monthly 53
Every Six Months 53
Servicing the Outer Enclosure Fan Filters 53
Replacing the Bottle Filters 55
Replacing the Xenon Lamp in the GeneTitan MC Instrument 57
Troubleshooting 62
Log Files 62
AGCC Log Files for GeneTitan MC Systems 63
Problems and Solutions 63
Insufficient Disk Space Notice 63
Problems and Solutions 64
Error Messages 66
Using AGCC E-mail Notification with GeneTitan MC Instrument 66
Context Specific Messages 66

Appendix B GeneTitan® Instrument Recovery Procedure 79

Recovering the Instrument from a Power Interruption 79
Recovering the Process After a User Power Interruption 79
Procedure for Recovering a Process 79
Recovering the Process After a Power Failure 80
UPS Low Battery Condition 80
Resuming the Process from a Workstation or Application Freeze 81
Shutting Down 81

Before Using the GeneTitan® Instrument

This chapter illustrates the consumables associated with the GeneTitan Instrument and their proper care and handling. Topics covered in this chapter include:

- *Equipment, Reagents and Consumables Required* on page 1
- *Proper Installation of the GeneTitan Tray Consumables* on page 4
- *Proper Tray Alignment and Loading* on page 5
- *Correct Placement of Stain Trays and Covers* on page 7
- *Labeling GeneTitan Reagent Trays* on page 8
- *Anti-Static Procedure for GeneTitan Instrument Trays and Covers* on page 9
- *E-mail and Telephone Notifications from the GeneTitan Instrument* on page 11

Equipment, Reagents and Consumables Required

Consumables for the GeneTitan Family of Instruments

All consumables for the GeneTitan Family of Instruments are provided by Affymetrix. The following table provides guidance on the consumables that are shipped with the Array Plate.

IMPORTANT: All covers must have barcodes. Discard any cover without a barcode.

Table 1.1 GeneTitan Instrument consumables

Item	Part Number	Labware Image	Information
HT Array Plate Package	All array plates have the PN 202091 etched on the on the plastic		The HT Array Plate shipping package includes the following: ▪ The function of the clear plastic cover for the Array Plate is to protect the Array Plate during transport. You may discard this after removing the Array Plate. ▪ The Array Plate must be protected at all times from damage or exposure to dust. The Array Plate must be in the Blue Array Plate Protective Base at all times. ▪ The Blue Array Plate Protective Base in the package must be used to protect the Array Plate from damage.

Table 1.1 GeneTitan Instrument consumables (Continued)

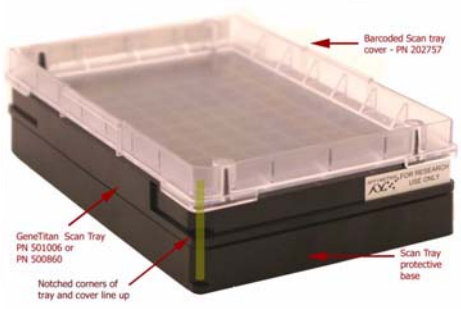
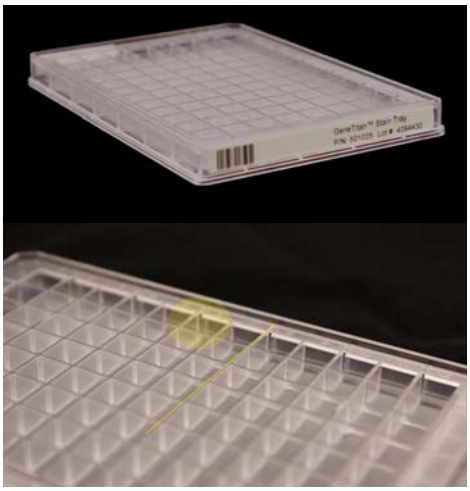
Item	Part Number	Labware Image	Information
	HT Scan Tray Packaging	 NOTE: The Scan Tray cover should have a barcode on the plastic. If the tray cover you received does not have a barcode or does not match the scan tray cover shown in this picture, please contact your Field Application Specialist.	The HT Scan Tray shipping package includes the following: ▪ The HT Scan tray includes a Scan Tray cover. The tray cover should be used to cover the scan tray before placing the tray in the GeneTitan MC Instrument. The Tray cover should be deionized before use. See the section Anti-Static Procedure for GeneTitan Instrument Trays and Covers on page 9 for the anti-static procedure. ▪ The Scan tray must be protected at all times from damage or exposure to dust. The Scan Tray must be in the Black Plate Cover at all times. ▪ The Black Scan tray cover in the package is used to protect the scan tray glass from damage. The black scan tray is distinct from the Blue Array Plate Protective Base and must not be used with the Array Plate. Remove the protective base from the scan tray before loading the scan tray with the scan tray cover.
Black Scan Tray protective base	PN 202096		▪ The Black Scan tray cover in the package is used to protect the scan tray glass from damage. The black scan tray is distinct from the Blue Array Plate Cover and must not be used with the Array Plate. ▪ Remove and discard the protective base rom the scan tray before loading
Scan Tray with cover	Scan Tray 501006 Cover 202757		▪ The GeneTitan Scan tray must be loaded with the scan tray cover into the GeneTitan instrument ▪ Do not load the scan tray with the protective base

Table 1.1 GeneTitan Instrument consumables (Continued)

Item	Part Number	Labware Image	Information
GeneTitan Stain Trays	501025		The GeneTitan stain trays are packaged in ziplock bags to keep them free of dust. The GeneTitan stain trays are barcoded and tray have separator walls that are flush with the frame of the stain tray as shown by the yellow line.
GeneTitan Scan and Stain Tray cover	202757		▪ The GeneTitan scan and stain tray covers are provided to prevent any evaporation of the stains in stain trays and the array holding buffer in the scan tray. ▪ All stain and scan trays must be placed in the GeneTitan instrument with the GeneTitan stain tray cover. ▪ All tray covers must be de-ionized to remove static electricity prior to placing the cover on the tray. ▪ See the section *Anti-Static Procedure for GeneTitan Instrument Trays and Covers* on page 9 for the anti-static procedure
GeneTitan Stain Tray cover	Tray 501025 Cover 202757		▪ The GeneTitan stain trays must be placed in the GeneTitan instrument with the GeneTitan stain tray cover. ▪ It is important to remove the static electricity on the cover and the stain tray prior to loading the tray into the GeneTitan instrument. ▪ See the section *Anti-Static Procedure for GeneTitan Instrument Trays and Covers* on page 9 for the anti-static procedure
GeneTitan Hyb Tray	500867		▪ The GeneTitan hybridization trays are packaged in white pouches with the label "HT Hybridization Tray". ▪ After aliquoting the hyb cocktail into the hybridization tray, the tray should be loaded into the GeneTitan instrument with the barcode facing away from the operator, i.e., Barcode should be on the back side

Proper Installation of the GeneTitan Tray Consumables

It is very important that you install the GeneTitan tray consumables in the proper orientation. The barcode faces into the instrument.

IMPORTANT: You must rotate and install the trays so that the barcode faces into the instrument. See Figure 1.1 on page 4 for additional details.

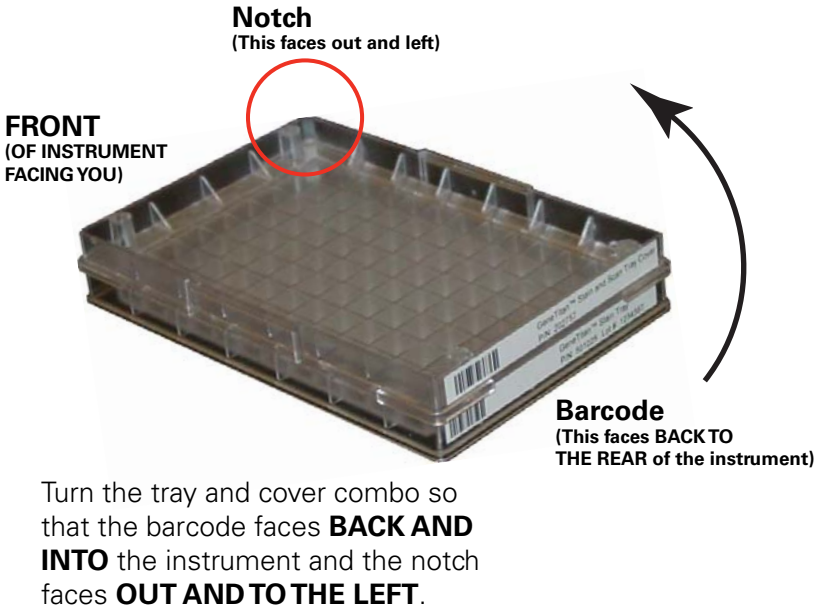
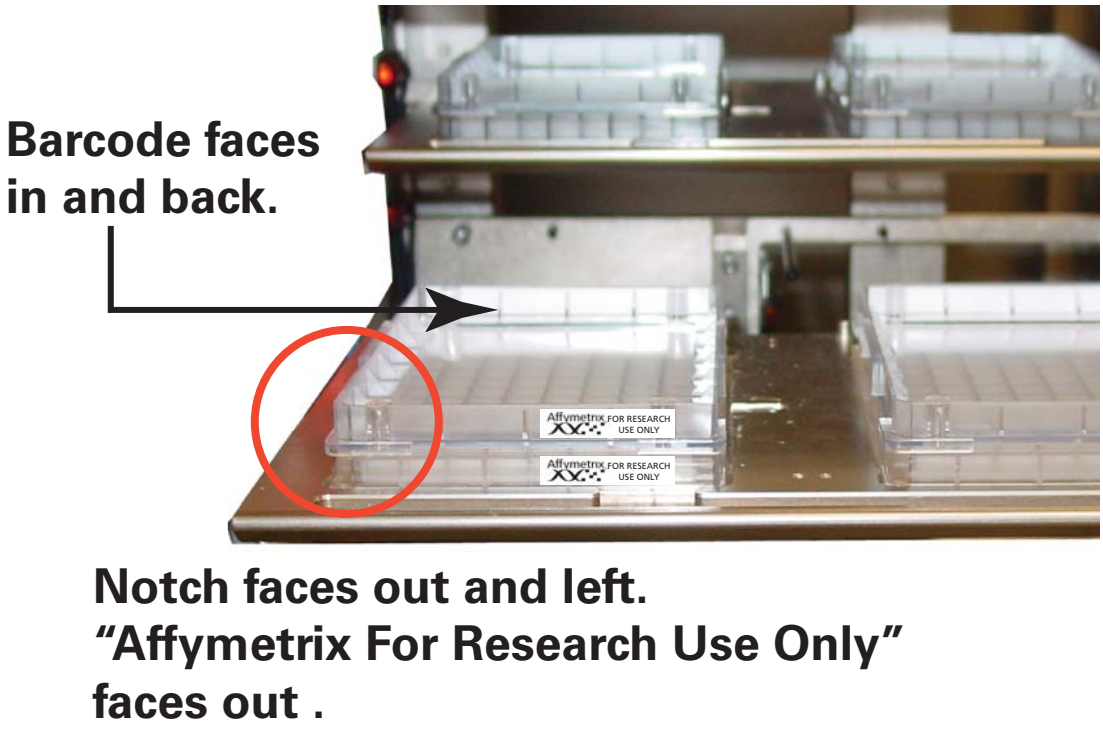

Notch
(This faces out and left)
FRONT
(OF INSTRUMENT
FACING YOU)
Barcode
(This faces BACK TO
THE REAR of the instrument)
Turn the tray and cover combo so that the barcode faces **BACK AND INTO** the instrument and the notch faces **OUT AND TO THE LEFT**.

Figure 1.1 The proper installation of the GeneTitan tray consumables (the image shows the Stain Tray and the Stain Tray cover as an example)


Barcode faces in and back.
Affymetrix FOR RESEARCH USE ONLY
Affymetrix FOR RESEARCH USE ONLY
Notch faces out and left.
"Affymetrix For Research Use Only" faces out .

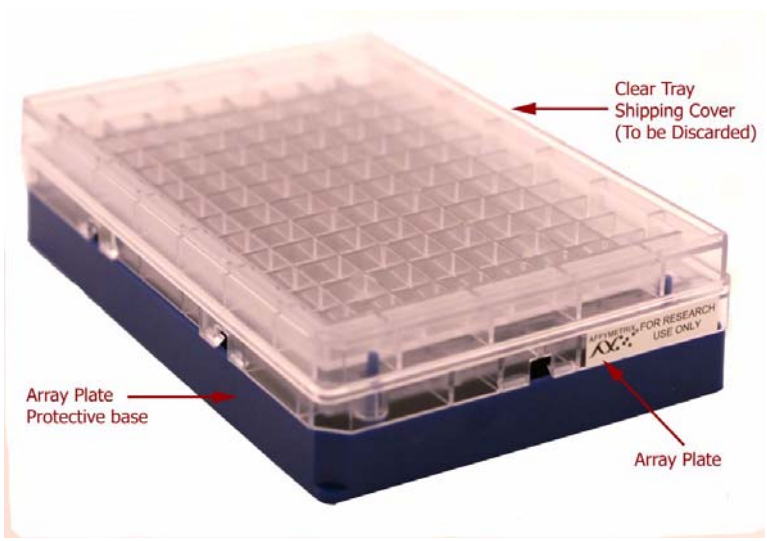
Proper Tray Alignment and Loading

Proper alignment and loading of plates, covers and trays is critical when using the GeneTitan Instrument. Each plate, cover and tray has one notched corner. The notched corner of plates, trays, covers and bases must be in vertical alignment with each other, and placed in position A1 per the Tray Alignment guide inside each GeneTitan Instrument drawer (Figure 1.3 and Figure 1.4 on page 7).

IMPORTANT: When running a multi-plate workflow, you must pay careful attention to the software prompts that tell you which side of the drawer to place or remove a plate/tray.

TIP: Mark the notched corner of each plate, cover and tray with permanent marker to help ensure proper alignment and loading onto the GeneTitan Instrument.

Figure 1.2 Array Plate packaging (left) and Array plate in blue tray (right)

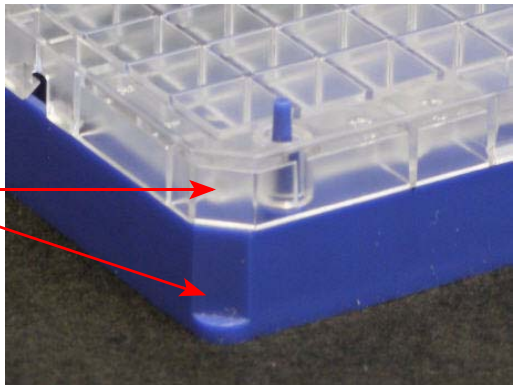


Array Plate with protective packaging

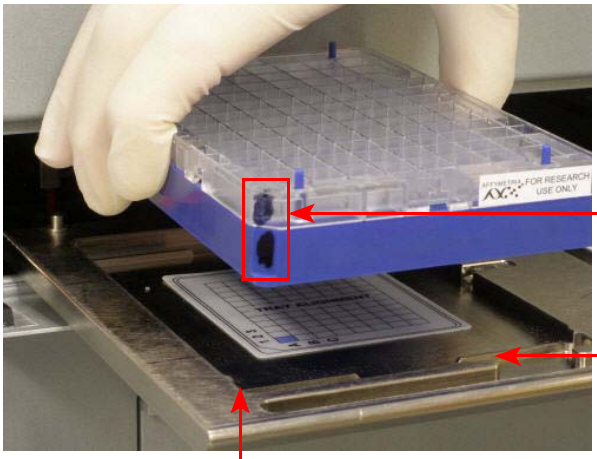
Array Plate with shipping cover removed

IMPORTANT: The clear tray shipping cover must be discarded prior to loading the array plate. The array plate must be loaded with the blue protective base.

Figure 1.3 Proper alignment and loading of plates, covers and trays in the GeneTitan Instrument.



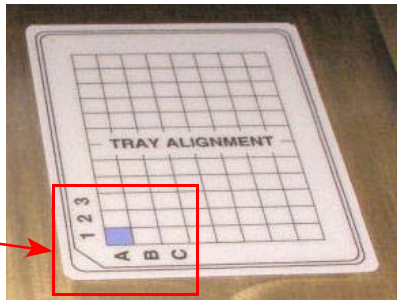
Notched corner of Array Plate aligned with notched corner of blue base.



Tip

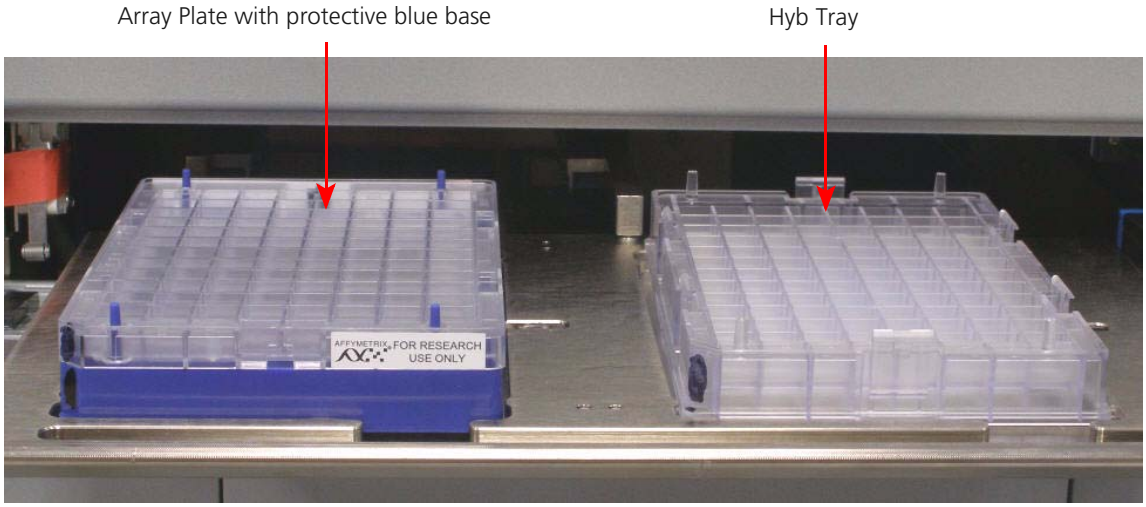
Mark the notched corner of each plate, cover and tray with permanent marker to help ensure proper alignment and loading.

Plates and trays must be seated in this groove.



The notched corner of all plates, bases, and covers and must be seated in this corner of the drawer per the Tray Alignment guide.

Figure 1.4 Array Plate with protective blue base and the Hyb Tray aligned and properly loaded into drawer 6.



Correct Placement of Stain Trays and Covers

IMPORTANT: **Always place the *flat* side of the cover against the Stain Tray.**

Figure 1.5 Placement of covers on trays

Correct placement of cover on Stain Tray.

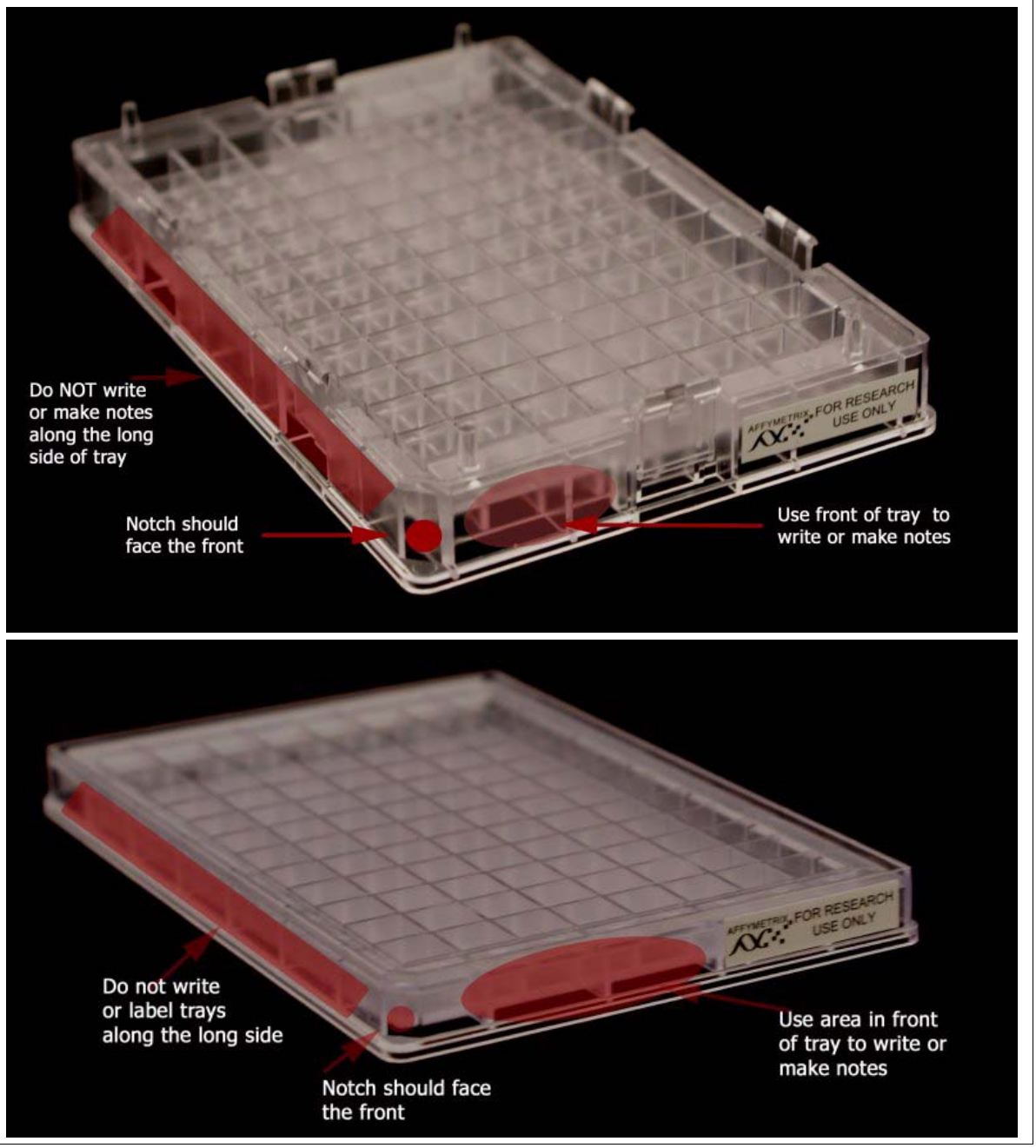
Incorrect placement of cover on Stain Tray.

Labeling GeneTitan Reagent Trays

When preparing the reagent trays to be loaded onto the GeneTitan Instrument, it is convenient to mark the front of each tray in a way that identifies its contents.

IMPORTANT: It is critical that the Hyb Tray and the Stain Trays be labeled on the front edge of the tray only. The front edge of the tray is the short side with the lettering A1 through H1. Do **NOT** mark these trays on any other side, as this can interfere with sensors inside the of GeneTitan Instrument and result in experiment failure. To ensure proper placement of lids onto stain trays, and trays onto the GeneTitan Instrument, you can also mark the notched corner of the trays and lids.

Figure 1.6 Marking GeneTitan Hyb Trays and Stain Trays


Do NOT write or make notes along the long side of tray
Notch should face the front
Use front of tray to write or make notes
AFFYMETRIX FOR RESEARCH USE ONLY
Do not write or label trays along the long side
Notch should face the front
Use area in front of tray to write or make notes
AFFYMETRIX FOR RESEARCH USE ONLY

Anti-Static Procedure for GeneTitan Instrument Trays and Covers

Use the following technique to destatic GeneTitan Instrument Stain Tray trays and lids.

IMPORTANT: **Except for the HT array tray and the hybridization tray, you must deionize all GeneTitan stain trays, stain tray covers and scan tray covers using an anti-static gun. You must do this before you fill the trays with reagents and before you place the covers on the trays. Deionization removes the static electricity. The presence of static electricity on the underside of the cover can cause the gripper to lift the tray along with the tray cover and can result in an aborted run. See Figure 1.7, Figure 1.8 and Figure 1.9.**

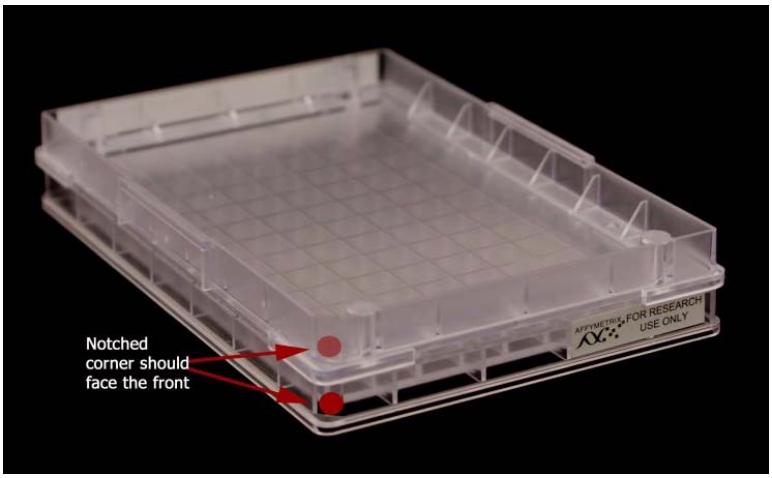
Deionize the inner surface of each tray and lid:

- The surface of the tray with the wells that will hold reagents.
- The surface of the lid that will cover the reagents.

CAUTION: **Do not deionize the scan tray or hybridization tray.**

Figure 1.7 Scan Tray with Cover. Deionize only the cover.

Figure 1.8 Stain Tray with Cover. Deionize the cover and the tray.



Testing the Anti-Static Gun

Verify that the anti-static gun (PN 74-0014, Figure 1.9.) is in working condition. You can use the protective cap on the gun to determine if the anti-static gun is releasing ions. The procedure is as follows:

Keep the cap on the gun and press the trigger and release it. Observe the discharge through the viewing slot on the cap of the anti-static gun. There is a visible light observed in the viewing window on the cap when charged ions are discharged. If you cannot see the light, the gun may be un-usable and you should replace it.

Each anti-static gun is capable of 50,000 trigger operations which is sufficient for approximately 200-250 runs on the GeneTitan instrument.

IMPORTANT: Make sure you remove the cap from the gun when you deionize a tray or cover.

Deionization Procedure

The following process provides guidance on how to use the anti-static gun on the stain and scan tray covers only. See Figure 1.9.

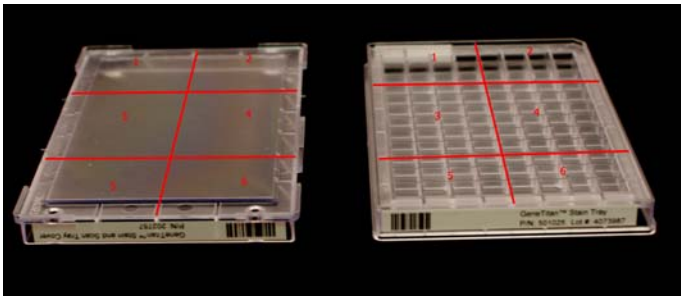
WARNING: The deionization steps 4 and 5 will damage the HT arrays on the plate. Before using the anti-static gun, ensure that the HT array plates remain in their protective pouch and placed away from the deionization area. You must place the scan tray and hybridization tray away from the area where you are performing deionization.

1. Treat the plate or lid as if it were divided into 6 sections, and deionize as follows.
2. Place a Kimwipe on the benchtop.
3. Place the stain tray on a table top. Use the anti-static gun to aim at the center of each of the six sections on cover or tray and pull the trigger. Ensure that a stream of ionized particles settles on all wells of the stain tray or cover to dissipate the static electricity. Squeeze and release the trigger slowly 3 times over each section (Squeeze for approximately two seconds and release for approximately two seconds).
4. Place the stain tray cover with the flat surface facing upward on the Kimwipe.

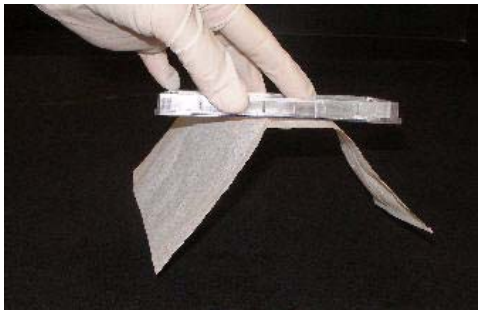
   Aim the anti-static gun (P/N 74-0014) approximately one-half inch away from the flat surface and pull the trigger. As you pull the trigger move the gun across the cover so that the stream of ionized particles settles on all areas of the cover and dissipates the static electricity. Squeeze and release the trigger slowly 3 times over each section (Squeeze for approximately two seconds and release for approximately two seconds).
5. Place the treated cover or tray on the Kimwipe and lift it up.
6. Do one of the following:
   - If the Kimwipe does not adhere to the plastic, proceed with the step.
   - If the Kimwipe adheres to the plastic, then perform steps 3 and 4 again. If it continues to adhere to the plastic, then the gun is not working and you should replace it.

Figure 1.9 Removing the static charge from Stain Trays and lids.

Treat the inside surface of Stain Trays (right) and cover (left).



IMPORTANT: Remove static gun cover before use.



If a Kimwipe sticks to treated surface, treat again following this procedure.

If the Kimwipe still adheres, replace the antistatic gun.

E-mail and Telephone Notifications from the GeneTitan Instrument

We strongly recommend that you configure the Affymetrix GeneChip® Command Console (AGCC) software to send you GeneTitan Instrument notifications. It is critical that you know when the instrument requires your attention — either for sample handling or troubleshooting. Rapid notification can lessen the risk of sample loss.

Notifications can be sent to e-mail addresses and telephones. Refer to the AGCC user manual for instructions.

The types of notifications available will let you know when a process:

- Starts
- Completes
- Aborts
- Encounters an error

Starting the GeneTitan® Instrument and AGCC

This chapter provides instruction for starting the GeneTitan Instrument and Affymetrix® GeneChip Command Console® Software (AGCC). An overview of the expression array plate processing options is presented.

Starting Command Console Launcher and the GeneTitan Instrument Control Software

Use the Affymetrix® GeneChip Command Console® (AGCC) software Launcher to access the AGCC GeneTitan Instrument Control (IC) software.

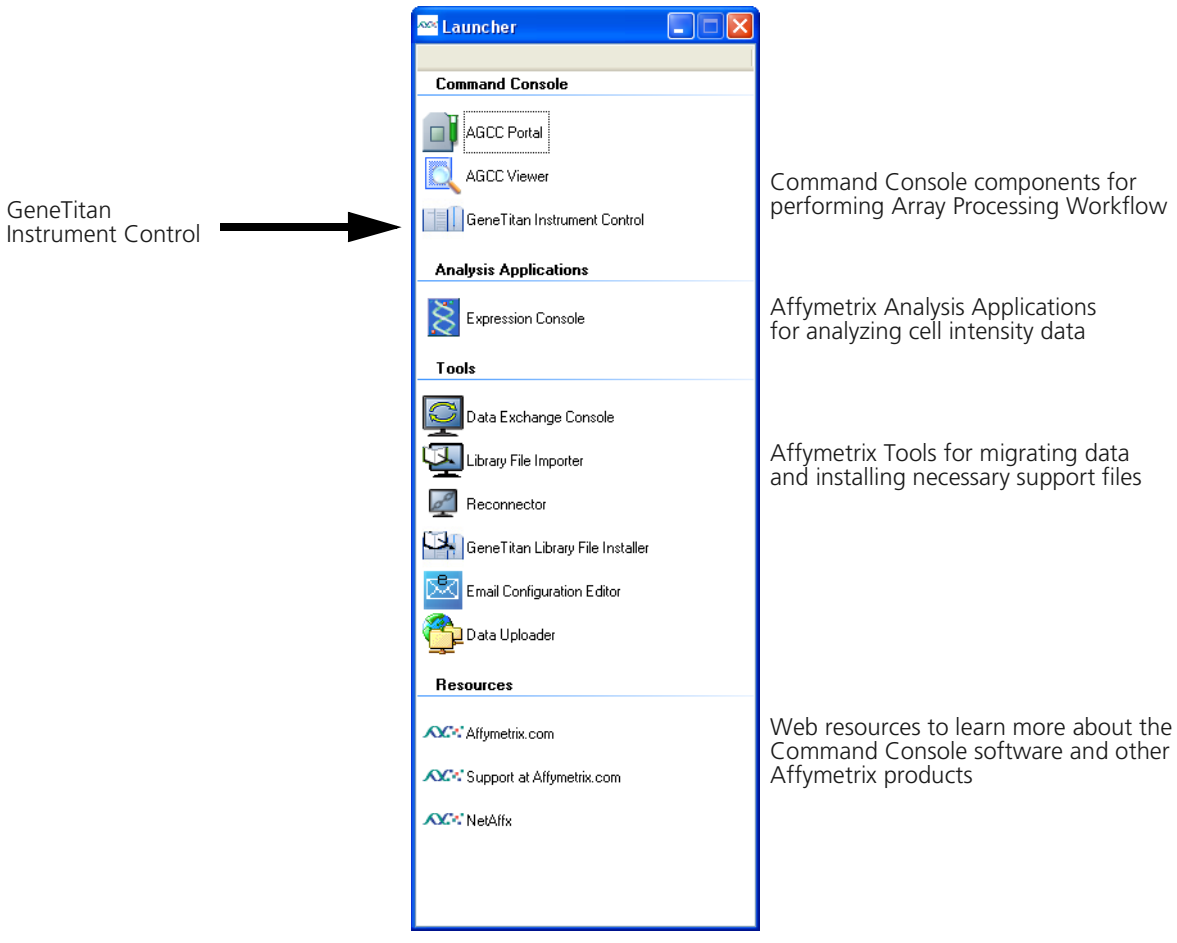
Starting the Command Console Launcher:

The Command Console® Launcher (Figure 2.1) provides a convenient way to open the AGCC software applications.

1. Click the Microsoft® Windows® **Start** button and select **Programs** → **Affymetrix** → **Command Console** → **Affymetrix Launcher**; or double-click the **Launcher** shortcut on the desktop.

   The Command Console Launcher opens (Figure 2.1).

Figure 2.1 Command Console Launcher window the GeneTitan Family of instruments



The launcher enables you to start AGCC software components and tools including:

- AGCC Instrument Control Software for the GeneTitan family of instruments: **AGCC GeneTitan Control**. For more information on AGCC Controls please refer to the *Affymetrix® GeneChip® Command Console® User Manual* (P/N 702569).

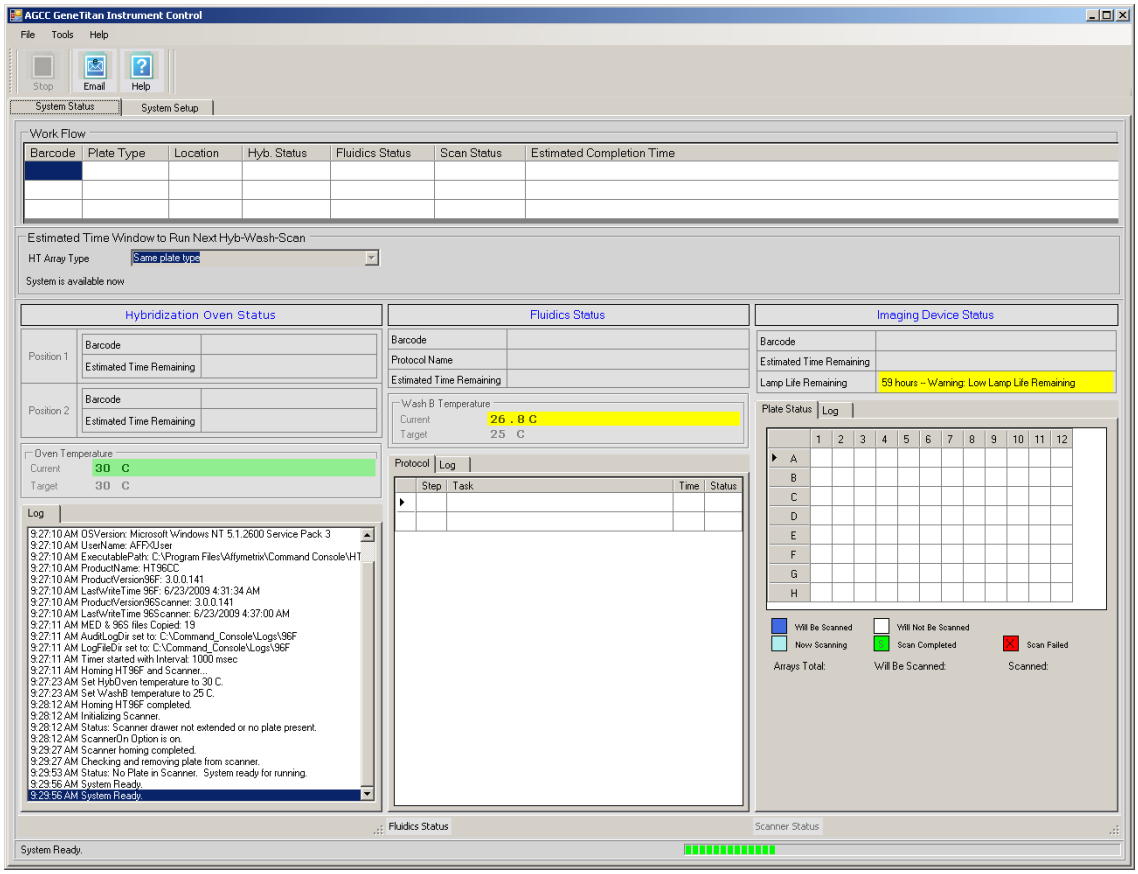
Starting the AGCC GeneTitan Instrument Control software:

The AGCC GeneTitan Instrument Control software is used to control the GeneTitan Instruments.

1. Click the AGCC GeneTitan Instrument Control icon in the Affymetrix Launcher; or Click the Microsoft® Windows® **Start** button and select **Programs** → **Affymetrix** → **Command Console** → **AGCC GeneTitan Control**.

   The AGCC GeneTitan Instrument Control window opens (Figure 2.2).

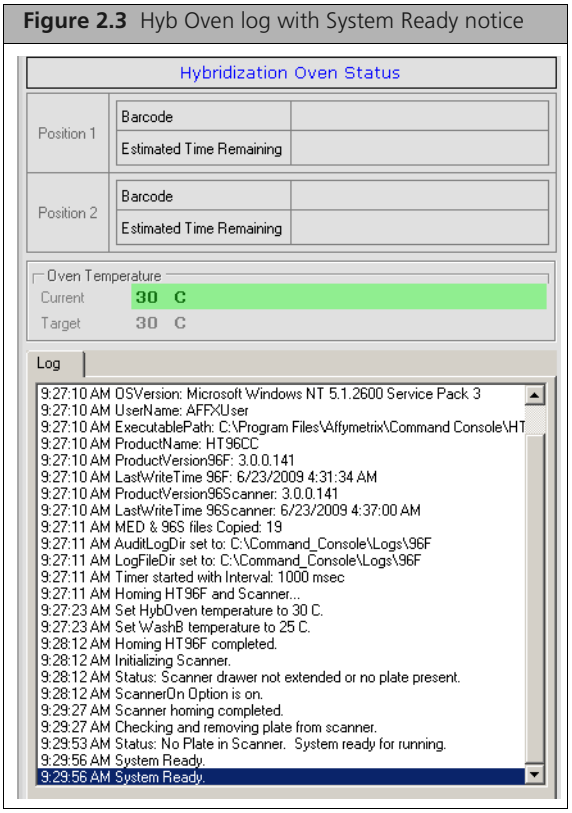
Figure 2.2 AGCC GeneTitan Control software, System Status Tab



The software proceeds through the initialization process and starts the GeneTitan instrument.

You can track the initialization process in the Hybridization Status pane (Figure 2.3); when the initialization is completed, System Ready is displayed in the log, and you can display the **System Setup** tab.

Figure 2.3 Hyb Oven log with System Ready notice


Hybridization Oven Status
Position 1
Barcode
Estimated Time Remaining
Position 2
Barcode
Estimated Time Remaining
Oven Temperature
Current 30 C
Target 30 C
Log
9:27:10 AM OSVersion: Microsoft Windows NT 5.1.2600 Service Pack 3
9:27:10 AM UserName: AFFXUser
9:27:10 AM ExecutablePath: C:\Program Files\Affymetrix\Command Console\HT
9:27:10 AM ProductName: HT96CC
9:27:10 AM ProductVersion96F: 3.0.0.141
9:27:10 AM LastWriteTime 96F: 6/23/2009 4:31:34 AM
9:27:10 AM ProductVersion96Scanner: 3.0.0.141
9:27:10 AM LastWriteTime 96Scanner: 6/23/2009 4:37:00 AM
9:27:11 AM MED & 96S files Copied: 19
9:27:11 AM AuditLogDir set to: C:\Command_Console\Logs\96F
9:27:11 AM LogFileDir set to: C:\Command_Console\Logs\96F
9:27:11 AM Timer started with Interval: 1000 msec
9:27:11 AM Homing HT96F and Scanner...
9:27:23 AM Set HybOven temperature to 30 C.
9:27:23 AM Set WashB temperature to 25 C.
9:28:12 AM Homing HT96F completed.
9:28:12 AM Initializing Scanner.
9:28:12 AM Status: Scanner drawer not extended or no plate present.
9:28:12 AM ScannerOn Option is on.
9:29:27 AM Scanner homing completed.
9:29:27 AM Checking and removing plate from scanner.
9:29:53 AM Status: No Plate in Scanner. System ready for running.
9:29:56 AM System Ready.
9:29:56 AM System Ready.

The software interface has the following components (Figure 2.2):

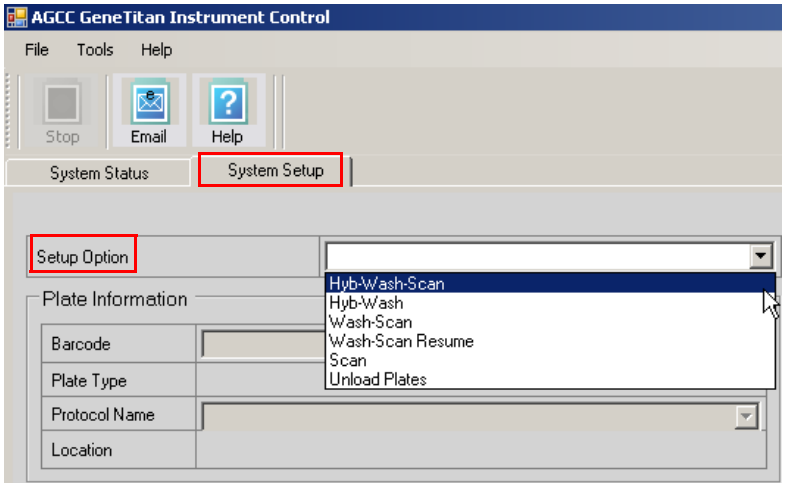
- **Menu bar**: Provides access to IC functions.
- **Tool bar**: Provides quick access to frequently used functions.
- **System Status tab**: Use to track the progress of array plates through the workflow.
- **System Setup tab**: Use to set up the GeneTitan Instrument for different workflows.
- **Status bar and Progress bar**: Displays information about the status of the GeneTitan Instrument and the workflow in progress.

Setup Options for Array Plate Processing

The processes (setup options) available for processing array plates are shown in Figure 2.4. A brief description of each option is given below.

1. In AGCC select the **System Setup** tab (Figure 2.4).

Figure 2.4 Setup options for processing array plates



2. Click the **Setup Option** drop-down list box to view options:
   - Hyb-Wash-Scan
   - Hyb-Wash
   - Wash-Scan
   - Wash-Scan-Resume
   - Scan
   - Unload Plates

Hyb-Wash-Scan

This setup option enables you to hybridize, wash-stain and scan an array plate on the GeneTitan Instrument.

IMPORTANT: When running a multi-plate workflow, you must pay careful attention to the software prompts that tell you which side of the drawer to place or remove a plate/tray.

- *Hyb*: the array plate is moved to the hybridization oven inside the instrument. Each sample in the Hyb Tray is hybridized to an array on the Array Plate.
- *Wash*: samples on arrays are washed and stained.
- *Scan*: The array plate is moved to the imaging device in the GeneTitan Instrument and each array is scanned.

Please go to Chapter 3, *Hyb-Wash-Scan Workflow* on page 19 for instructions on the Hyb-Wash-Scan Workflow for expression array plates.

Hyb-Wash

If this setup option is selected, array plate processing will stop after the array has gone through fluidics processing. Use this option if an array plate cannot be scanned on the same GeneTitan Instrument as the one used for hybridization and fluidics processing.

If the array plate cannot be scanned immediately after the Hyb-Wash process is complete:

1. Wrap the array plate (in the scan tray with black protective base) in aluminum foil to protect from light.

   No lid is required. Do not invert the plate stack. If inverted, the Hold Buffer will spill out of the tray.
2. Store at 4°C.
3. Scan the array plate within 3 days or less.

When ready to scan the array plate:

1. Keeping the plate protected from light, bring the plate to room temperature for ~ 20 min.
2. Remove the aluminum foil and load onto the GeneTitan Instrument

Please go to Chapter 3, *Hyb-Wash-Scan Workflow* on page 19 for instructions on the Hyb-Wash Workflow for expression array plates.

Wash-Scan

Use this option if:

- You wish to bypass the Hybridization step and perform only the Wash/Stain and Scan steps.
- In this mode of operation, you can process one array plate at a time.

Please go to Chapter 4, *Wash-Scan Workflow* on page 37 for instructions on the Wash-Scan Workflow

Scan

Use this option:

- To rescan an entire array plate or specific arrays on a plate that failed to scan for reasons such as bubbles or gridding failure.
- If you have hybridized and performed the fluidics processes off the GeneTitan Instrument.
- In this mode of operation, you can process one array plate at a time.

Please go to Chapter 5, *Scan Workflow* on page 47 for instructions on the Imaging Workflow

Unload Plates

Use this option to unload plates and trays from the instrument when:

- Array plate processing is complete.
- Array plate processing has been aborted.

Wash-Scan-Resume

The intent of the recovery procedure is to save the array plate, array plate process and the instrument when a power interruption (power blackout or emergency shutdown, or the user cycle the power of the instrument) occurs or if the workstation and application unexpectedly freezes during the operation. Please go to Appendix B, *GeneTitan® Instrument Recovery Procedure* on page 79 for further instructions.

Hyb-Wash-Scan Workflow

Hybridization Buffer, Stains, and Wash Buffer Volumes Required for the GeneTitan® Instrument

This section describes the reagent consumption per process on the GeneTitan® Instrument for processing HT array plates when running the manual assay.

Table 3.1 The Minimum Volumes of Buffer and Rinse Required to Process on GeneTitan

Fluid Type	Amount Required for One Array Plate	Minimum Level in Bottle	
		One Array Plate	Two Array Plates
Rinse	300 mL	450 mL	900 mL
Wash A	~920 mL	1,040 mL +	2,000 mL
Wash B	300 mL	450 mL	600 mL

Table 3.2 Volumes Required to Process HT Array Plates per Run

Reagent	Amount Required for One Array Plate	Aliquot into Columns			Number of Plates that can be Processed using the GeneTitan™ Hybridization, Wash, and Stain Kit for 3' IVT Arrays (P/N 901530)		
		16-Format	24-Format	96-Format	16-Format	24-Format	96-Format
Hybridization Target	90 µL/well	5 & 7	5, 7 & 9	All	N/A	N/A	N/A
Wash A*	~920 mL				1	1	1
Wash B*	300 mL				1	1	1
Stain 1 and 3	105 µL/well	5 & 7	5, 7 & 9	All	6	4	1
Stain 2	105 µL/well	5 & 7	5, 7 & 9	All	6	4	1
Array Holding Buffer	150 µL/well	All	All	All	6	4	1

** Please use GeneTitan® Wash Buffers A and B Module (PN 901583) for ordering Wash A and B buffers for additional plates*

NOTE: The GeneTitan instrument requires a minimum of 450 mL of Wash B fluid in the Wash B reservoir prior to starting the process. For additional plate runs you will need to purchase additional Wash A and Wash B.

IMPORTANT: The instrument must have a minimum of 450 mL of Wash B in the Wash B reservoir of the instrument for each HT array plate prior to starting Hyb, Wash, Stain and Scan process. The waste bottle should be empty.

Loading the Instrument for Hyb-Wash-Scan Workflow

This workflow runs the array plate through all steps. In the Hyb-Wash-Scan workflow for expression arrays, the array plate, hyb tray, scan tray, and reagent trays are loaded at the same time.

To run this workflow, you need to:

- Select **Hyb-Wash-Scan** during the initial setup.

NOTE: If the target preparation is completed on the Biomek FXᴾ Target Prep System Instrument, the robot will aliquot the hyb cocktail, stains and array holding into the appropriate GeneTitan consumables. Refer to the appropriate user guide for the target preparation for additional information.

The static electricity from stain trays must be dissipated before the consumables are placed on the Biomek FXᴾ TPE system. The stain tray covers and scan tray cover must be processed as described in this user guide to remove static electricity.

NOTE: The hyb cocktail must be aliquoted into the GeneTitan Hyb Tray as described in the user guide for the appropriate expression assay. Refer to the specific user guide for that assay for further information.

1. Place all the stain trays and scan and stain tray covers required to process a run on a table top. Use the anti-static gun and follow the de-static procedure described in *Anti-Static Procedure for GeneTitan Instrument Trays and Covers* on page 9.

   IMPORTANT: When aliquoting the reagents be careful to prevent bubbles from forming. If bubbles should form remove them using a pipette tip.

   IMPORTANT: You must dissipate the static electricity from every cover before placing on top of the stain trays.

2. Aliquot 105 µL of the Stain 1 into the GeneTitan Stain Tray identified with the label “GeneTitan® Stain Tray P/N 501025” on the tray.
3. Use the stain tray cover provided with the GeneTitan Consumable Upgrade kit to cover the Stain 1 tray as shown in Figure 3.4.
4. Aliquot 105 µL of the Stain 2 into the GeneTitan Stain Tray identified with the label “GeneTitan® Stain Tray P/N 501025” on the tray.
5. Use the stain tray cover provided with the GeneTitan Consumable Upgrade kit to cover the Stain 2 tray as shown in Figure 3.4.
6. Aliquot 105 µL of the Stain 3 into the GeneTitan Stain Tray identified with the label “GeneTitan® Stain Tray P/N 501025” on the tray.
7. Use the stain tray cover provided with the GeneTitan Consumable Upgrade kit to cover the Stain 3 tray as shown in Figure 3.5.
8. Aliquot 150 µL per well of the Array Holding Buffer into the GeneTitan Scan Tray identified with the label “HT Scan Tray P/N 501006” on the tray.

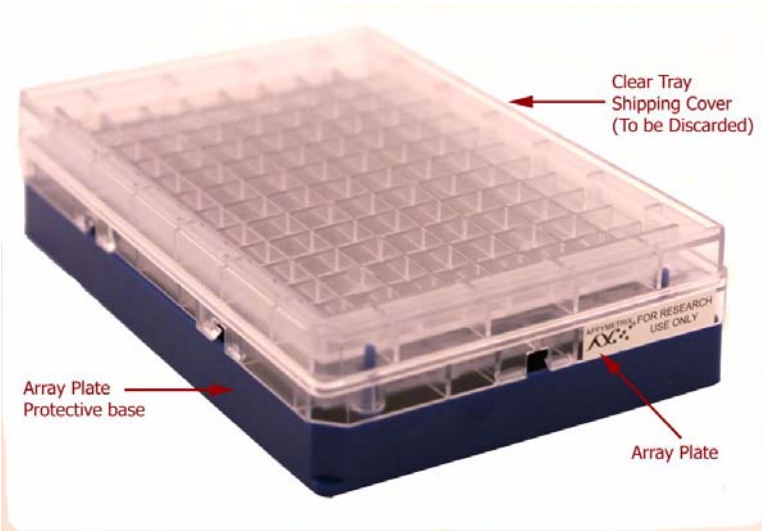
   IMPORTANT: You must fill all 96 wells with the Array Holding Buffer whether you use 16, 24 or 96-well format HT array plates.

9. Use the scan tray cover provided with the GeneTitan Consumable Upgrade kit to cover the scan tray as shown in Figure 3.6.

- This process will require the following GeneTitan consumables:
  - Array plate with cover tray (Figure 3.1)

    The HT Array Plate shipping package includes the following:
    - The clear Stain Tray shipping cover for the array plate must be discarded after removing the array plate from the pouch.
    - The Array Plate must be protected at all times from damage or exposure to dust. The Array Plate must be in the Blue Array Plate Cover at all times.

Figure 3.1 Array Plate packaging (left) and Array plate in blue tray (right)



Array Plate with protective packaging

Array Plate with shipping cover removed

- Hybridization Tray for the Hyb ready cocktail (Figure 3.2)

Figure 3.2 Hybridization Tray

- SAPE 1 Stain tray with cover (Figure 3.3)

Figure 3.3 SAPE 1 Stain tray with cover tray

- AB Stain tray with cover (Figure 3.4)

Figure 3.4 AB Stain tray with cover tray

- SAPE 2 Stain tray with cover (Figure 3.5)

Figure 3.5 SAPE 2 Stain tray with cover tray

- Scan Tray and scan tray cover with Holding buffer (Figure 3.6)

Figure 3.6 Scan tray with the scan tray cover without the black protective base

The software will direct you to load each plate or tray, opening the drawer and displaying the proper side for the tray or plate.

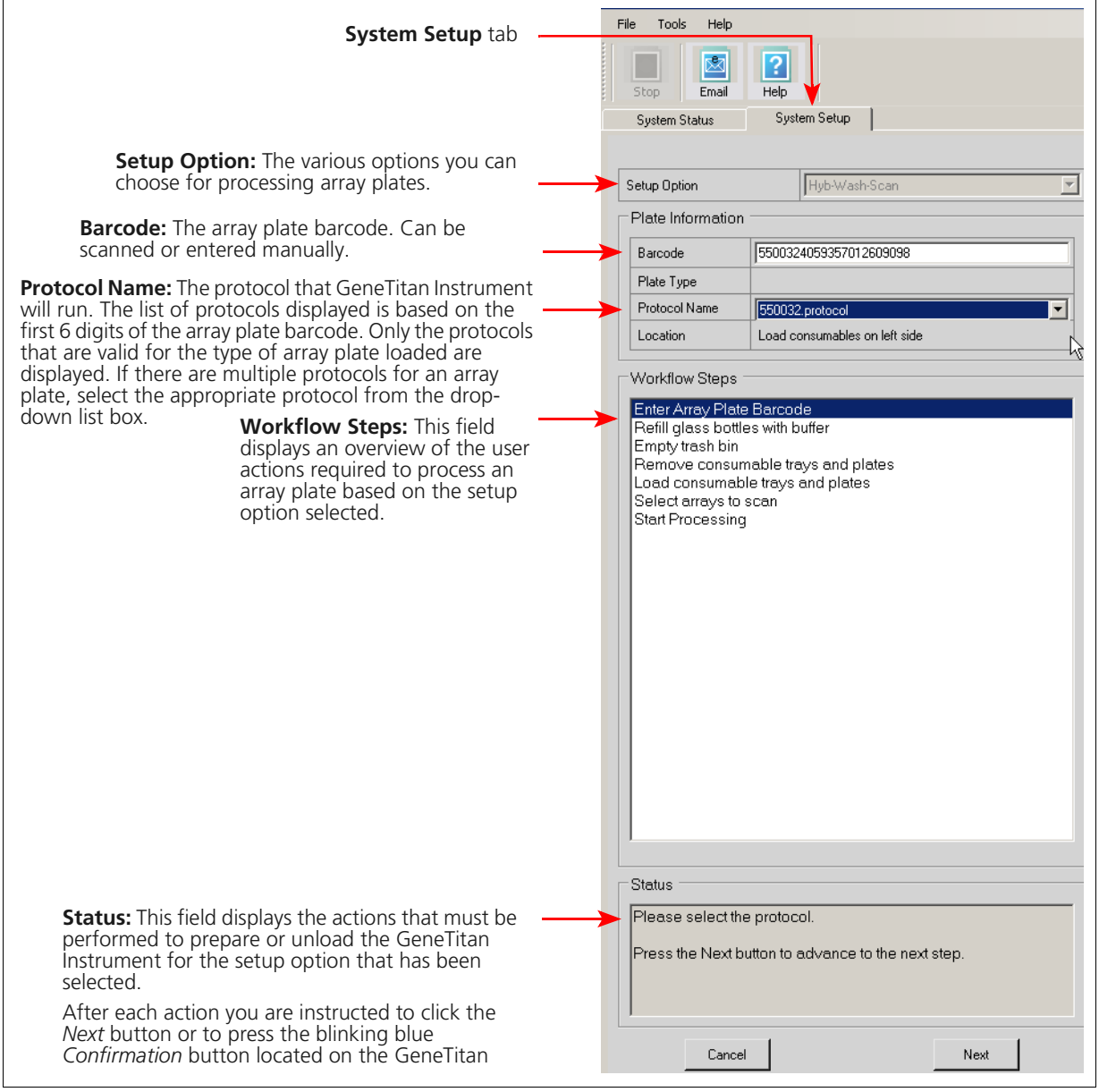
IMPORTANT: **When running a series of array plates through the Hyb-Wash-Scan workflow, you must pay careful attention to the software prompts that tell you which side of the open drawer to remove or place a plate or tray. If you load the array plate and trays for a second Hyb-Wash-Scan while the first workflow is still proceeding, you must be careful to remove and load the proper array plate and trays. See *Running the Hyb-Wash-Scan Workflow on a Series of Array Plates* on page 35 for more information.**

Loading Plates and Trays into the GeneTitan Instrument

To load the plates and trays:

1. Select the **System Setup** tab (Figure 3.7).

Figure 3.7 System setup tab and the information displayed in this pane.


System Setup tab
Setup Option: The various options you can choose for processing array plates.
Barcode: The array plate barcode. Can be scanned or entered manually.
Protocol Name: The protocol that GeneTitan Instrument will run. The list of protocols displayed is based on the first 6 digits of the array plate barcode. Only the protocols that are valid for the type of array plate loaded are displayed. If there are multiple protocols for an array plate, select the appropriate protocol from the drop-down list box.
Workflow Steps: This field displays an overview of the user actions required to process an array plate based on the setup option selected.
Status: This field displays the actions that must be performed to prepare or unload the GeneTitan Instrument for the setup option that has been selected.
After each action you are instructed to click the *Next* button or to press the blinking blue *Confirmation* button located on the GeneTitan
File
Tools
Help
Stop
Email
Help
System Status
System Setup
Setup Option
Hyb-Wash-Scan
Plate Information
Barcode
5500324059357012609098
Plate Type
Protocol Name
550032 protocol
Location
Load consumables on left side
Workflow Steps
Enter Array Plate Barcode
Refill glass bottles with buffer
Empty trash bin
Remove consumable trays and plates
Load consumable trays and plates
Select arrays to scan
Start Processing
Status
Please select the protocol.
Press the Next button to advance to the next step.
Cancel
Next

2. Select **Setup Option**: Hyb-Wash-Scan.
   Other options available are described under *Setup Options for Array Plate Processing* on page 16.
3. Click **Next**.
   Figure 3.7 **System Setup** tab and the information displayed in this pane.

NOTE: If there is not enough disk space, a message is displayed. Delete or move .dat files to another location to free up enough disk space for the data that will be generated by eight Array Plates.

The GeneTitan Single Channel has the following space requirements:

- 96 Array Plate requires ~ 24 GB
- 24 Array Plate requires ~ 6 GB
- 16 Array Plate requires ~ 4 GB

The GeneTitan MC system has the following space requirements:

- 96 Array Plate requires ~ 100 GB
- 24 Array Plate requires ~ 18 GB
- 16 Array Plate requires ~ 8 GB

A. Plate Information:

- **Barcode**: Scan or manually enter the Array Plate barcode and click Next.
  The first six characters of the barcode identify the type of plate being loaded, the protocol GeneTitan Instrument will use to process the plate, and the imaging device parameters required for this type of plate.
- **Protocol Name**: The protocol name is automatically selected. Click **Next**.

B. Refill fluidics bottles with buffer (Table 3.3)

1) Fill these bottles:

- Wash A: fill with Wash Buffer A - keep at 2 L full
- Wash B: fill with Wash Buffer B - keep at 1 L full
- Rinse: fill with DI Water - keep at l L full

2) Empty the waste bottle.

3) Press the Confirmation button on GeneTitan Instrument to continue. A fluidics check is run (~ 1 minute).

NOTE: The instrument control software will display a warning if it detects a problem during the fluid dispense operations. The filters in the GeneTitan Wash A, Wash B and DI Water bottles should be replaced if the software displays such a warning. Refer to *Replacing the Bottle Filters* on page 55 for the message displayed to the user and the procedure for replacing the filters

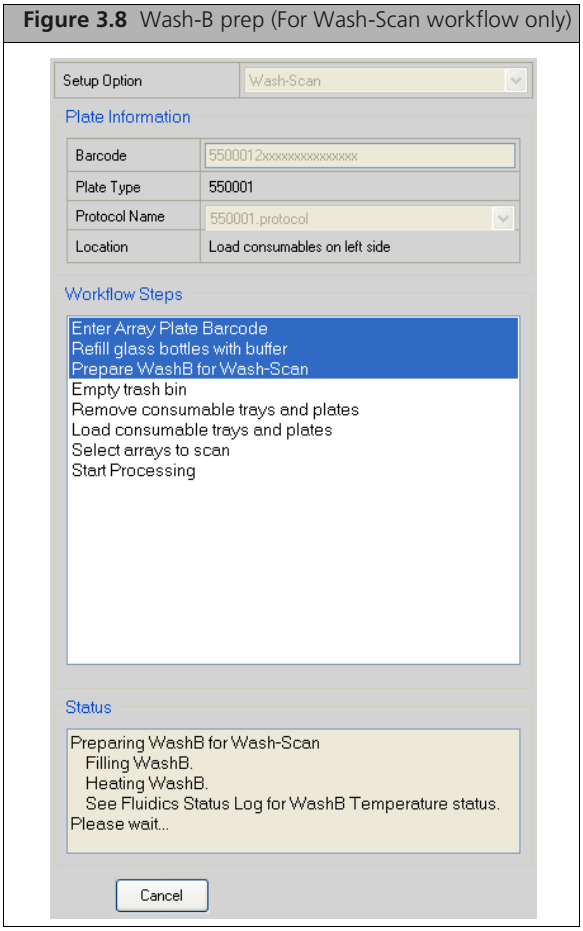
- Table 3.3 shows the minimum volumes of Wash A and B buffer and DI Water that are required for processing one or two plates.

Table 3.3 The Minimum Volumes of Buffer and Rinse Required to Process on GeneTitan

Fluid Type	Amount Required for One Array Plate	Minimum Level in Bottle	
		One Array Plate	Two Array Plates
Rinse	300 mL	450 mL	900 mL
Wash A	~920 mL	1,040 mL +	2,000 mL
Wash B	300 mL	450 mL	600 mL

C. During the initial setup, the application prompts you the system is warming the Wash B buffer to the preset temperature (Figure 3.8). When the Wash B target temperature is reached, the application prompts you to press the **Confirmation** button.

Figure 3.8 Wash-B prep (For Wash-Scan workflow only)



D. Empty trash bin.

1) Open the trash bin and empty. If already empty, the trash bin remains locked and the Status pane reads “Trash bin is empty.”

2) Press the **Confirmation** button to continue.

E. Remove consumable trays and plates.

1) Remove used trays and plates when drawers open. If no consumables to remove, the Status window reads “Drawers are empty.”

2) Press the Confirmation button to continue.

F. Load consumable trays and plates as follows:

1) Follow the prompts in the Status window.

2) Once loaded, examine each cover for droplets of liquid.

3) If any liquid is present, remove the tray, clean the cover and top of the tray with Kimwipes, and reload the tray.

CAUTION:

- **Orient trays as indicated by the guide inside the drawer. Improper orientation may cause the run to fail.**
- **Examine each cover for droplets of liquid after loading. Liquid on the cover can result in capillary phenomenon. As a result, the tray may stick to the cover and be lifted out of place inside the instrument.**

G. Follow the software prompts and load the array plate and trays as directed, pressing the **Confirmation** button after loading each tray or array plate.

Figure 3.9 Load Scan Tray

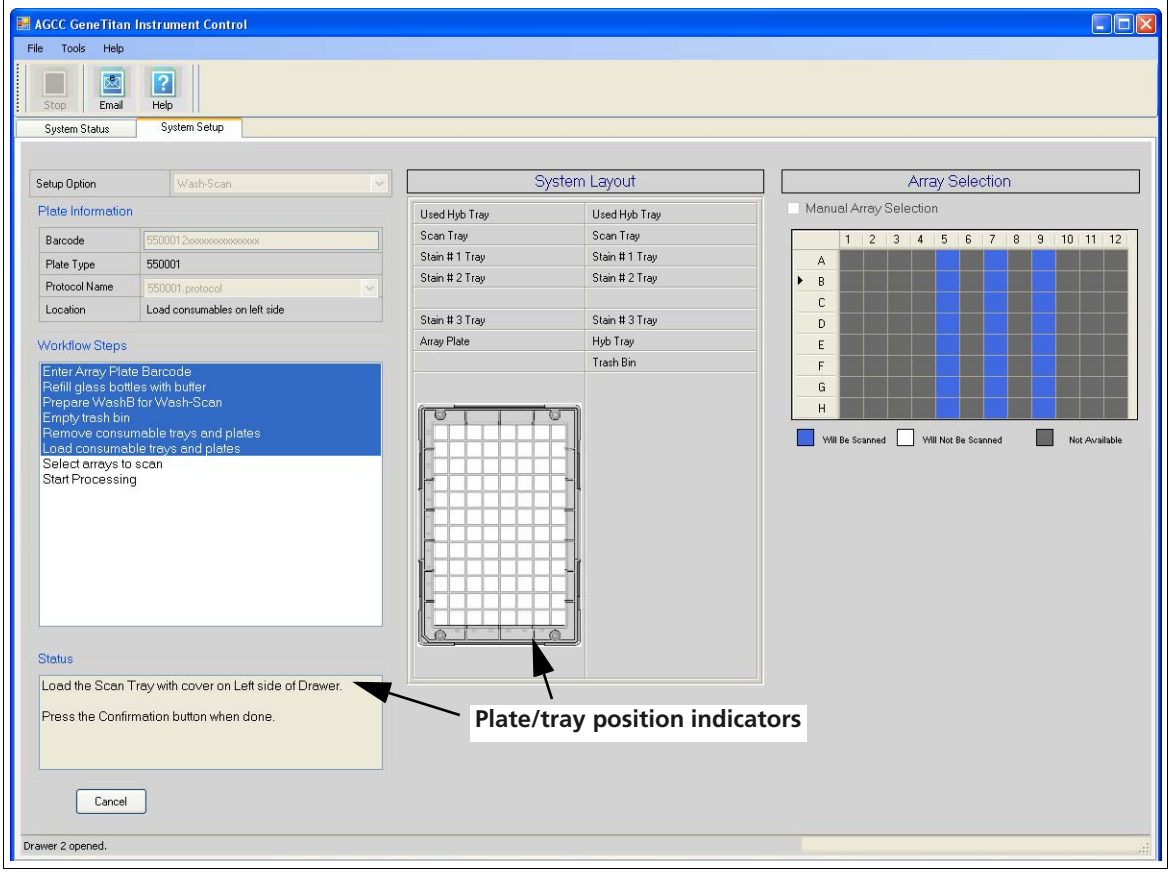
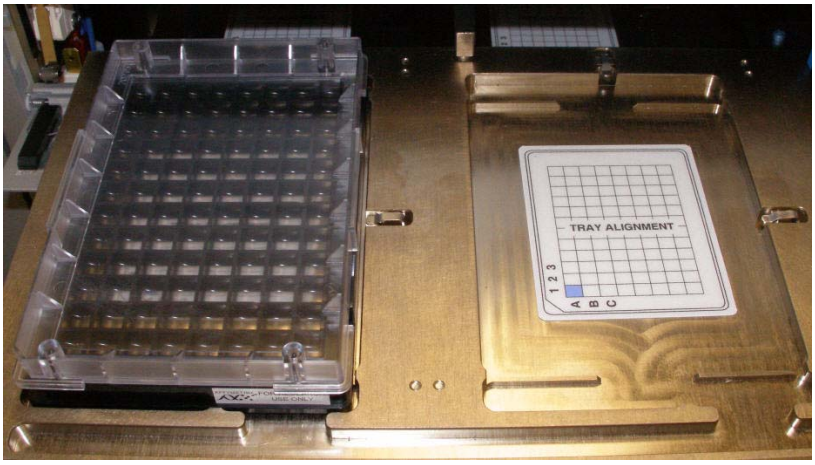
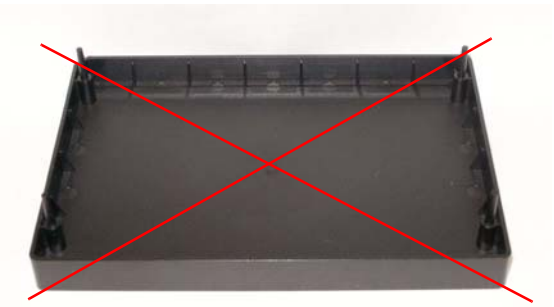


Figure 3.10 Scan tray loaded in drawer 2.

Scan Tray with cover loaded in drawer 2.

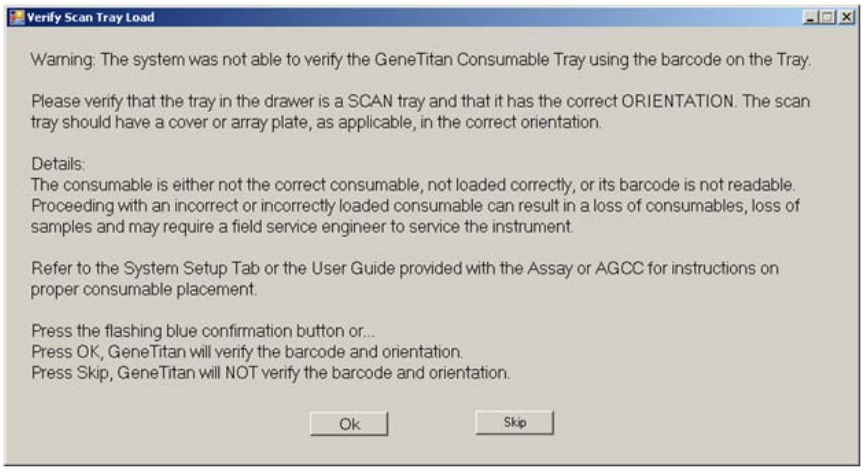


Do **NOT** load the protective black base packaged with the Scan Tray.



When you load the scan tray the internal bar code reader reads the barcode to see if it is the right kind of tray in the right orientation. If the information is correct, the application allows you to proceed to the next step. If the instrument is unable to read the barcode, it will push the tray out and will prompt you to load the correct plate with the proper orientation into the instrument (Figure 3.15).

Figure 3.11 Confirm tray type


Verify Scan Tray Load
Warning: The system was not able to verify the GeneTitan Consumable Tray using the barcode on the Tray.
Please verify that the tray in the drawer is a SCAN tray and that it has the correct ORIENTATION. The scan tray should have a cover or array plate, as applicable, in the correct orientation.
Details:
The consumable is either not the correct consumable, not loaded correctly, or its barcode is not readable. Proceeding with an incorrect or incorrectly loaded consumable can result in a loss of consumables, loss of samples and may require a field service engineer to service the instrument.
Refer to the System Setup Tab or the User Guide provided with the Assay or AGCC for instructions on proper consumable placement.
Press the flashing blue confirmation button or...
Press OK, GeneTitan will verify the barcode and orientation.
Press Skip, GeneTitan will NOT verify the barcode and orientation.
Ok
Skip

4. Click **OK** or press the **Confirmation** button to continue, or click **Skip** to continue without confirming the barcode read operation. Click **Skip** if the instrument has problems reading the barcode and after verifying that the trays have been placed in the proper orientation and are in the correct drawer location.

NOTE: This message can be triggered when using consumable trays or tray covers that do not have barcodes or if the barcodes are un-readable. The message can also appear if the barcode reader inside the instrument is in-operational or out of alignment. Please call your local Field Application Specialist if the "Confirm tray type" message is repeatedly displayed.

The software prompts you to load the stain trays.

After the trays have been loaded, the software prompts you to load the Array Plate and Hybridization Tray.

Figure 3.12 The proper installation of the GeneTitan tray consumables (the image shows the Stain Tray and the Stain Tray cover as an example)

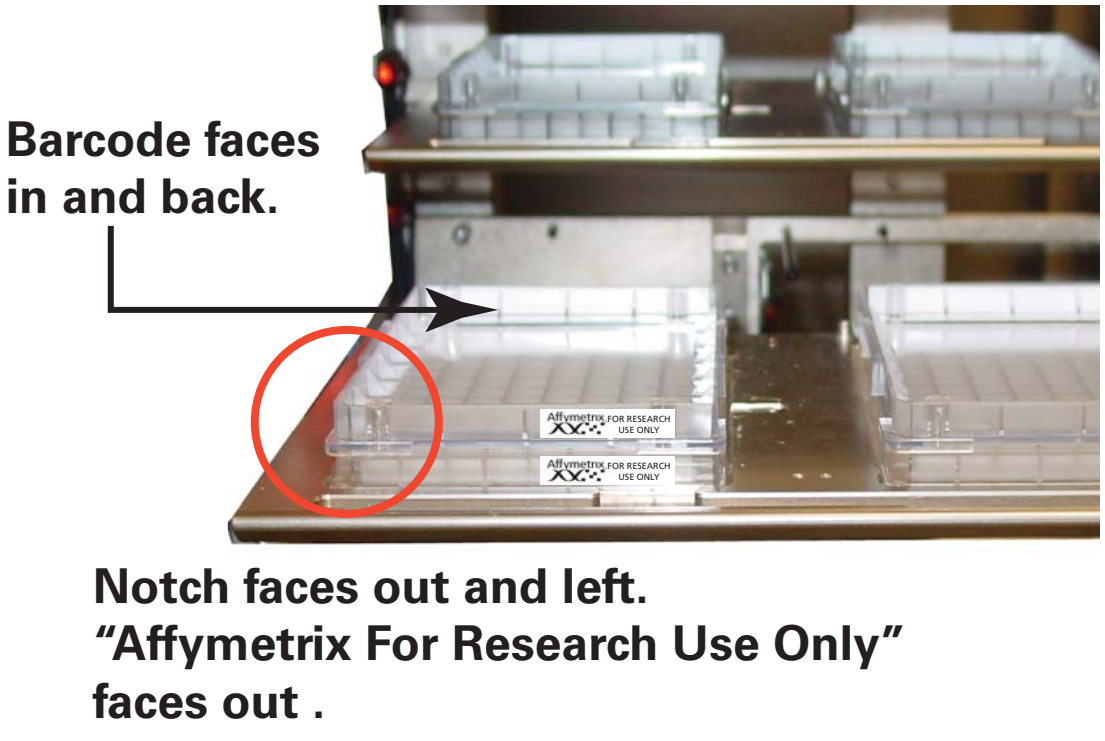
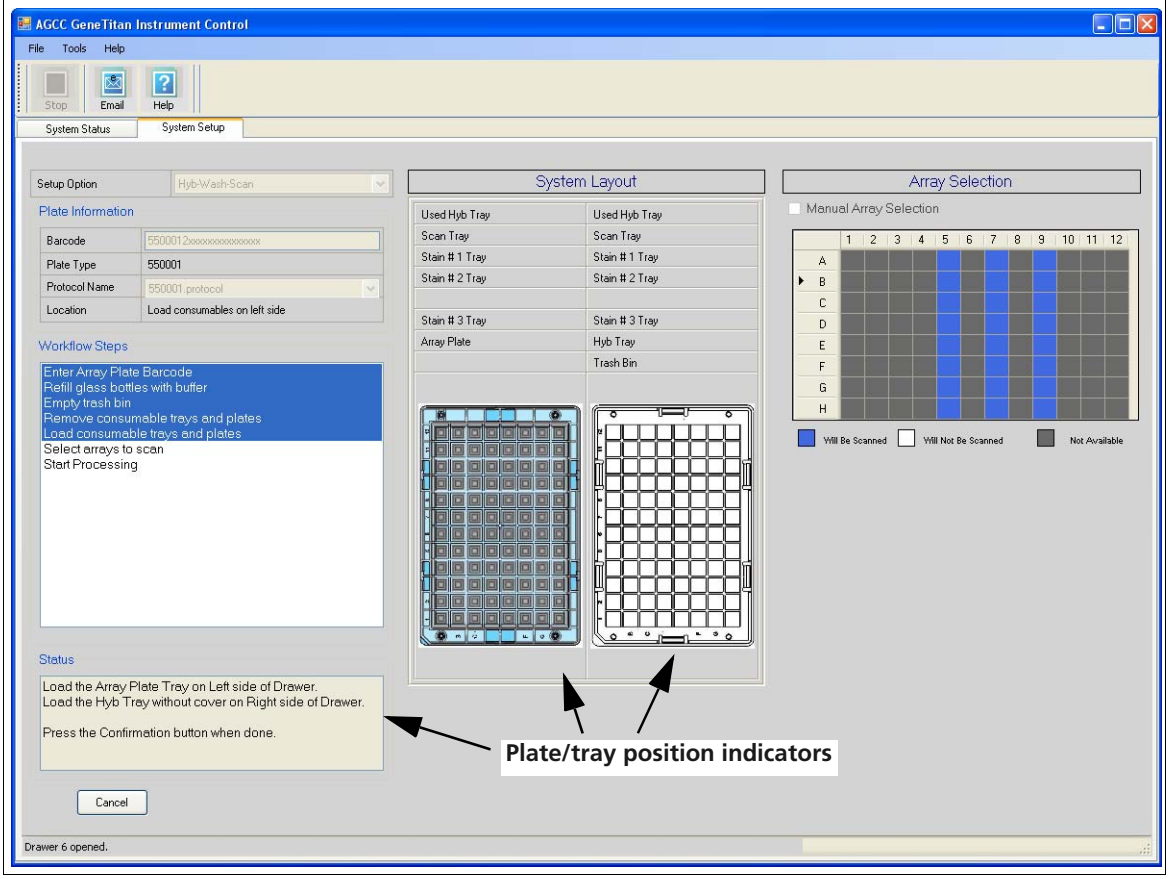
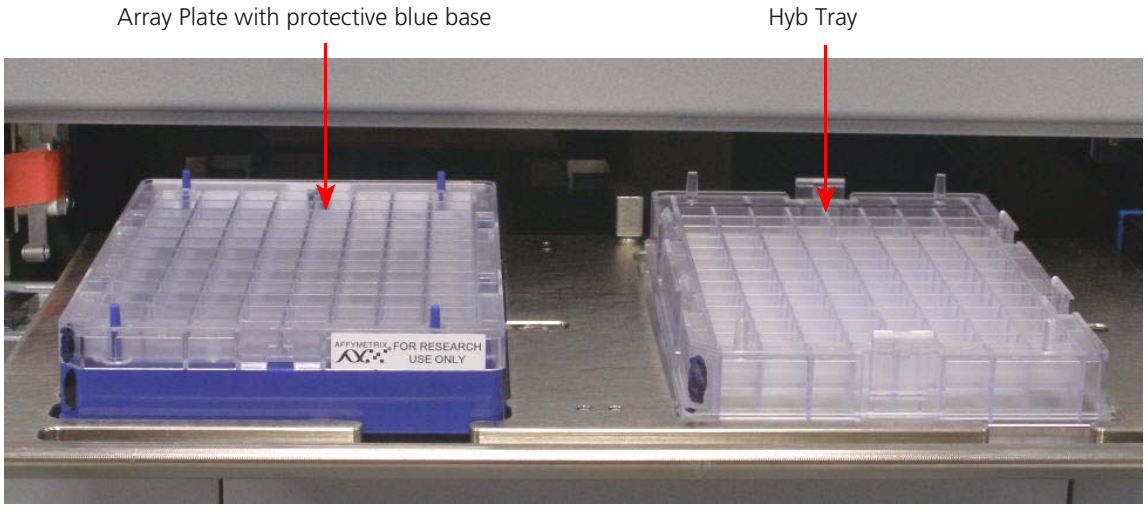

Barcode faces in and back.
Affymetrix FOR RESEARCH USE ONLY
Affymetrix FOR RESEARCH USE ONLY
Notch faces out and left.
"Affymetrix For Research Use Only" faces out .

Figure 3.13 Loading the Array Plate and Hyb Tray



5. Load the Array Plate and Hyb Tray and press the **Confirmation** button. Figure 3.14 illustrates the proper way to install the trays.

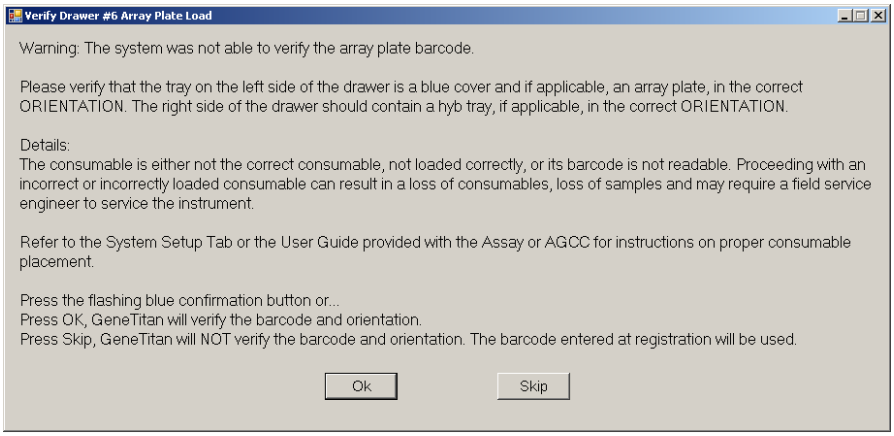
Figure 3.14 Array Plate with protective blue base and the Hyb Tray aligned and properly loaded into drawer 6.



When you load the Array Plate the internal bar code reader reads the barcode of the array plate then compares it with the barcode and the plate type specified in the Barcode field and Plate Type field on the Setup page.

If the information is correct, the application allows you to proceed to the next step. If the instrument is unable to read the barcode, it will push the tray out and will prompt you to load the correct plate with the proper orientation into the instrument (Figure 3.15).

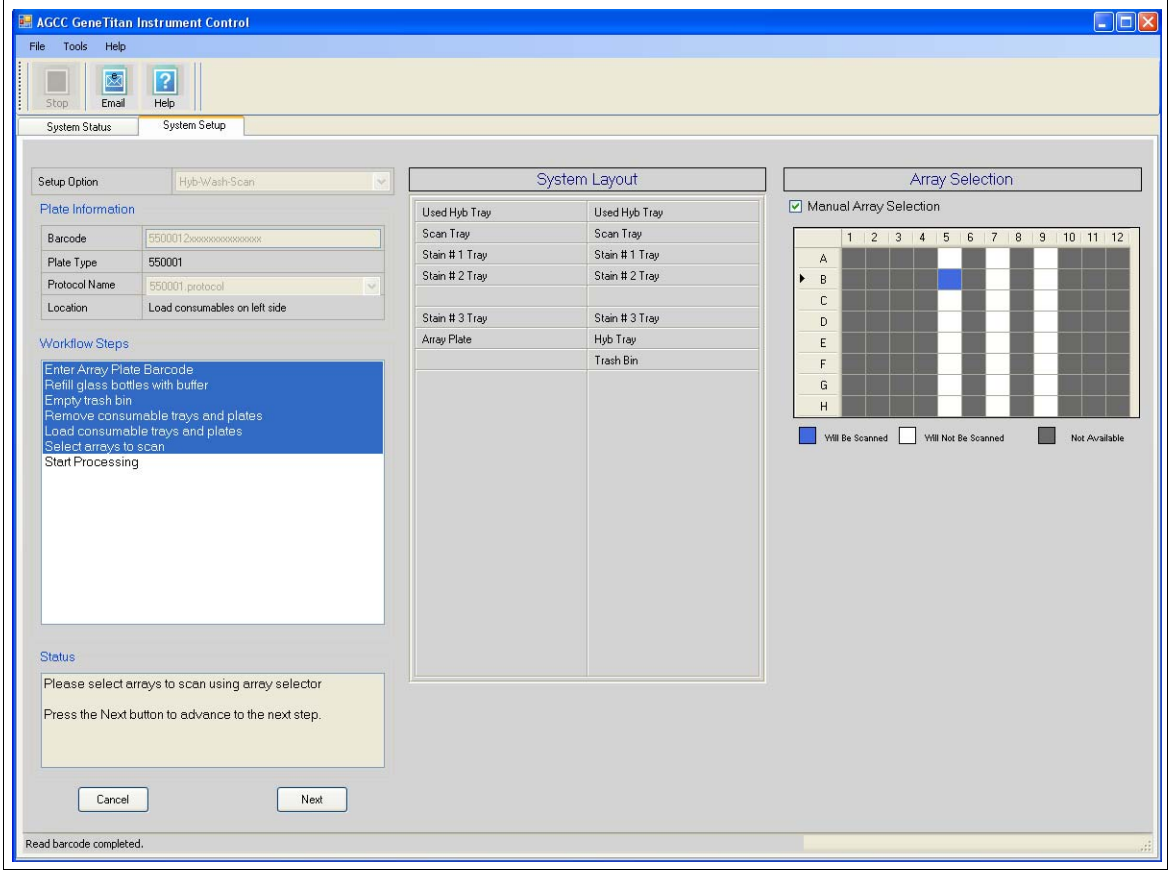
Figure 3.15 Barcode error notice


Verify Drawer #6 Array Plate Load
Warning: The system was not able to verify the array plate barcode.
Please verify that the tray on the left side of the drawer is a blue cover and if applicable, an array plate, in the correct ORIENTATION. The right side of the drawer should contain a hyb tray, if applicable, in the correct ORIENTATION.
Details:
The consumable is either not the correct consumable, not loaded correctly, or its barcode is not readable. Proceeding with an incorrect or incorrectly loaded consumable can result in a loss of consumables, loss of samples and may require a field service engineer to service the instrument.
Refer to the System Setup Tab or the User Guide provided with the Assay or AGCC for instructions on proper consumable placement.
Press the flashing blue confirmation button or...
Press OK, GeneTitan will verify the barcode and orientation.
Press Skip, GeneTitan will NOT verify the barcode and orientation. The barcode entered at registration will be used.
Ok
Skip

6. Click **OK** to retry and check the loading of the array plate, or click **Skip** to continue without confirming the barcode read operation.

   After the trays and plates have been loaded, the application prompts you to select the array(s) to be scanned (Figure 3.16). The application makes the default selection based on the barcode of the array plate. You can select the specific array to scan by overwriting the default selection.

Figure 3.16 Selecting array(s)



7. Use the default selections, or select arrays as described below:
   Each array on the plate is indicated by a single square.
   The color of the square indicates the array's status:

(dark blue)	Will be scanned.
(white)	Will not be scanned.
(gray)	Not available.

   To manually select arrays:

   A. Select the **Manual Array Selection** checkbox.

   B. Select the arrays to be scanned.

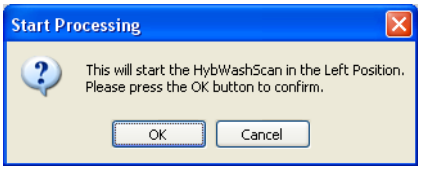
   You can select arrays by:

   - Clicking and dragging through the grid.
   - Pressing the **Ctrl** button down and clicking in different squares.

NOTE: If there is insufficient disk space on the computer's hard drives to store the data from a plate, a notice appears.

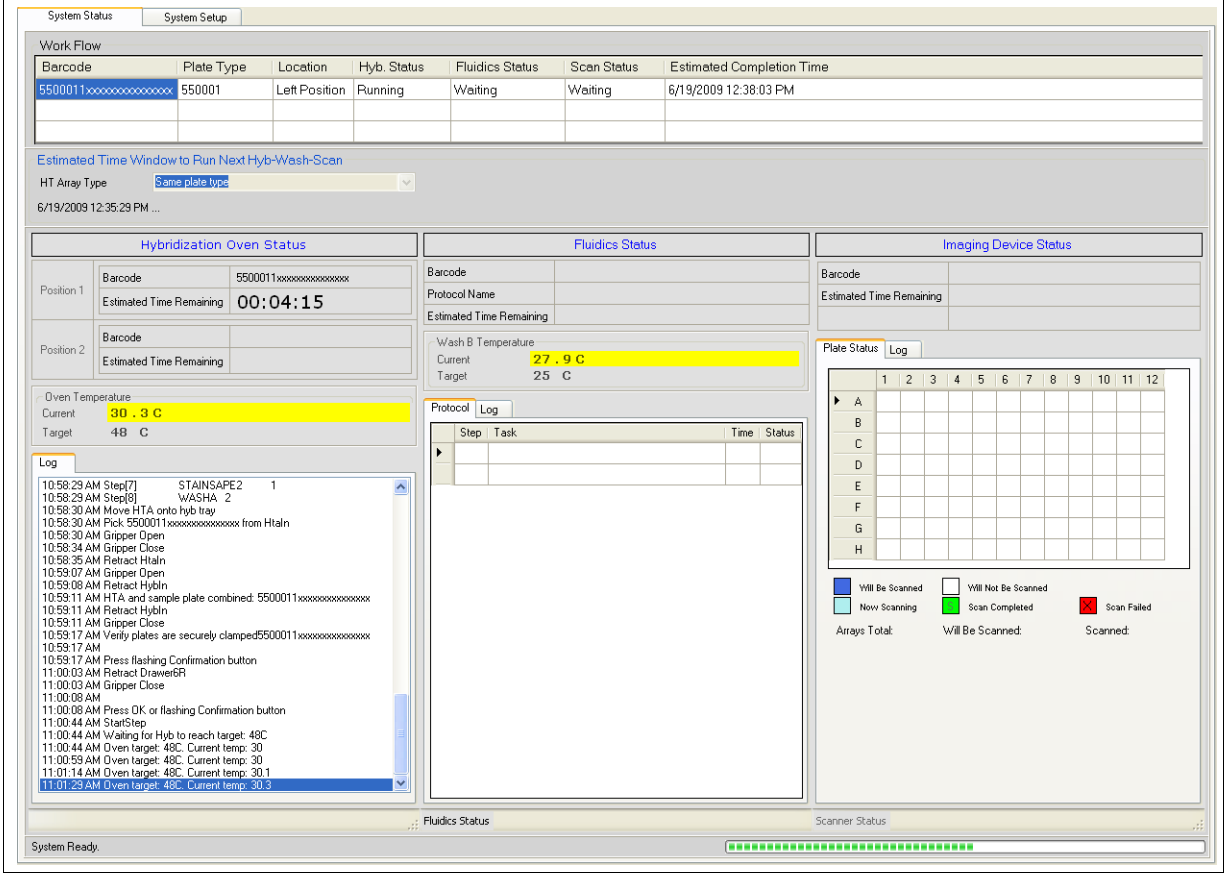
8. Click **Next** to start the run.
   The Start Processing dialog box opens (Figure 3.17).

Figure 3.17 Start Processing notice



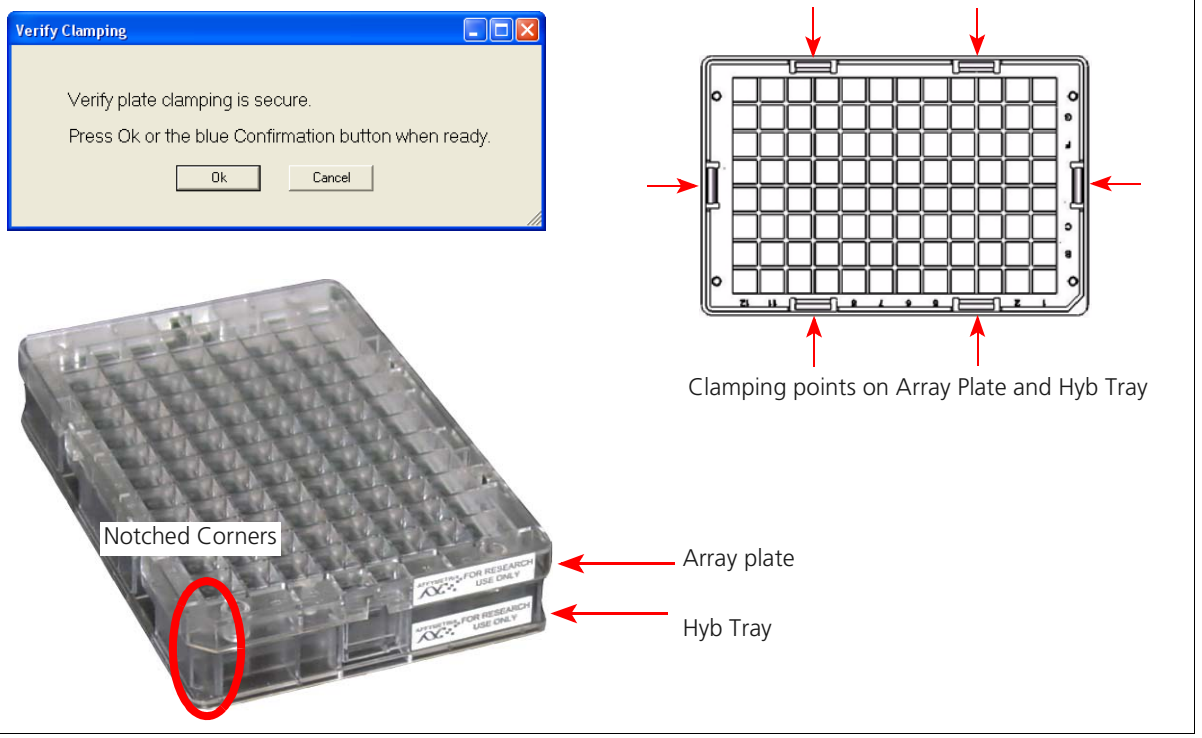
9. Click **OK** to begin the Hyb-Wash-Scan workflow.
   The instrument begins processing the array plate and the Status tab appears. (Figure 3.18).

Figure 3.18 Status tab



At the start of hybridization, after the array plate has been loaded on the hybridization tray, the drawer opens and the software prompts you to check the positioning of the array plate on the tray (Figure 3.19).

Figure 3.19 Verify Clamping notice and location of clamping points on the array plate and hyb tray



Confirm that the array plate is properly clamped and click **OK**.

The drawer closes and hybridization proceeds.

Running Multiple Workflows at the Same Time for Expression Arrays

When processing expression arrays, the GeneTitan Instrument can run two different workflows at the same time. This enables you:

- To load a series of array plates with hyb trays and consumables for the Hyb-Wash-Scan workflow to process more arrays.

> **IMPORTANT:** You cannot load Genotyping and Expression array plates at the same time.

- To run an array plate that was processed using a different system through the scan workflow while another array plate is going through earlier stages of the Hyb-Wash-Scan workflow.

Only certain types of workflows can be run at the same time, and delays may be necessary before starting the second workflow. These restrictions exist because an array plate should be scanned immediately after the wash and stain processing is finished, and GeneTitan scans one array plate at a time.

If you want to run a series of expression array plates through the Hyb-Wash-Scan workflow, you will need to wait for up to five hours after you start the first workflow before loading the second array plate, hyb tray, and consumables, to allow the first array plate to finish being scanned.

The delay time varies depending upon the number of arrays on the first array plate:

- Approximately five hours if the first array plate is a 96-array plate
- Approximately two and a half hours if the first array is a 16 or 24-array plate

When running a series of expression array plates, there are restrictions on the sorts of arrays you can run through in a series because of:

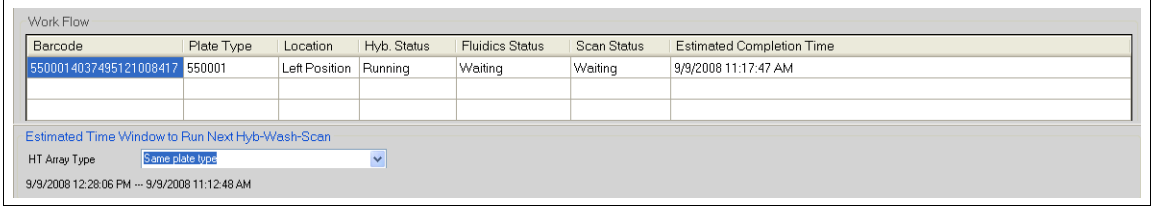
- Differences between the workflow for 3' IVT and WT expression array plates
- The number of arrays on a plate

There are limitations on your ability to mix array plates with different numbers of arrays, due to timing differences in the scan and other issues.

GeneTitan can process array plates with 16, 24, or 96 arrays on a plate.

The Workflow pane of the System Status screen (Figure 3.20) displays the time you need to wait before beginning a second workflow. The instrument will show prompts on plate load time based on the plate you run first.

Figure 3.20 Workflow pane



NOTE: The times shown will differ for 3' IVT and WT expression array plates.

If you are performing the Hyb and Wash processes on array plates in a different system, you can load a second array plate for the scan workflow shortly after you begin a hyb-wash-scan workflow. The Scan workflow option will not be available when there is not enough time to finish the scan workflow before the first array plate finished the wash and stain process.

Running the Hyb-Wash-Scan Workflow on a Series of Array Plates

The GeneTitan Instrument allows you to load a second array plate, hybridization plate, and other consumables into the trays before the first array plate has finished going through the workflow.

Since the array plate should be scanned immediately after the wash and scan processing is finished, you need to wait before loading the second array plate to give the system time to scan the first plate.

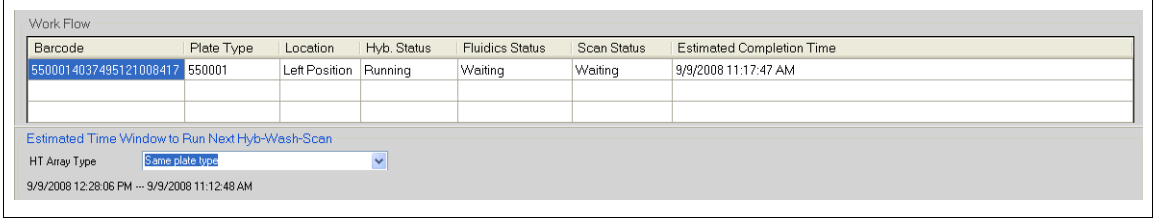
The delay time varies depending upon the number of arrays on the first array plate:

- Approximately five hours if the first array is a 96-array plate
- Approximately two and a half hours if the first array is a 16 or 24-array plate

The time you need to wait is displayed in the Workflow pane (Figure 3.21) of the Status tab.

NOTE: GeneTitan can process array plates with 16, 24, or 96 arrays on a plate.

Figure 3.21 Workflow pane



NOTE: The times shown will differ for 3' IVT and WT expression array plates.

When the system is available:

1. Click the **System Setup** tab.
2. Go through the Instrument setup process, following the software prompts as described in the section on *Loading the Instrument for Hyb-Wash-Scan Workflow* on page 20.

WARNING: The bottles are pressurized in normal operation. Wait until you see the prompt that the buffer bottles have been depressurized before opening and refilling or emptying the bottles.

IMPORTANT: When running a series of array plates through the hyb-wash-scan workflow, it is recommended to fill the fluid bottles to the full mark with wash and rinse fluids:

- Wash A: fill with Wash Buffer A - keep at 2 L full
- Wash B: fill with Wash Buffer B - keep at 1 L full
- Rinse: fill with DI Water - keep at 1 L full

3. Perform the loading procedure as described in *Loading the Instrument for Hyb-Wash-Scan Workflow* on page 20. Follow the software prompts to make sure that the plates and trays are loaded into the proper side of the drawer (Figure 3.22).

Figure 3.22 Loading the second scan tray into Drawer #2

IMPORTANT: When running a series of array plates through the Hyb-Wash-Scan workflow, you must be careful to remove and load the proper array plate and trays and pay careful attention to the software prompts that tell you which side of the open drawer to remove or place a plate or tray. In addition, you need to follow the restrictions for running plates with different numbers of arrays, as described in the note below.

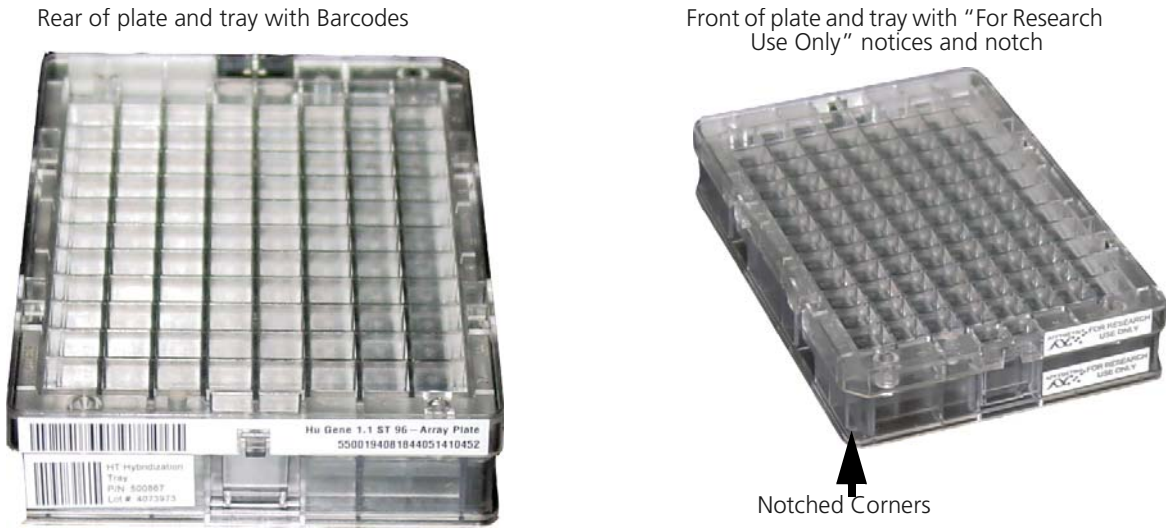
Wash-Scan Workflow

Loading Instrument for Wash-Scan Workflow

The Wash-Scan Workflow allows you to bypass the hybridization step and begin processing the array plate from the Wash-Stain and Scan steps without any user intervention. In this mode of operation, you can process one array plate at a time.

1. Select **Wash-Scan** during the initial setup. Other options available are described under *Setup Options for Array Plate Processing* on page 16.
   - This process will require the following GeneTitan consumables:
     - Array plate on Hyb Tray (Figure 4.1)

Figure 4.1 Array plate with hyb tray


Rear of plate and tray with Barcodes
Front of plate and tray with "For Research Use Only" notices and notch
Notched Corners

The Array Plate and Hyb Tray combo should be loaded into the instrument with the "For Research Use Only" label facing the user and the notch in the left front side, as shown on the right (Figure 4.1). The HT Array Plate barcode should be on the back side, facing away from the user.

- SAPE 1 Stain tray with cover (Figure 4.2)

Figure 4.2 SAPE 1 Stain tray with cover tray

- AB Stain tray with cover (Figure 4.3)

Figure 4.3 AB Stain tray with cover tray

- SAPE 2 Stain tray with cover (Figure 4.4)

Figure 4.4 SAPE 2 Stain tray with cover tray

- Scan Tray with Holding buffer (Figure 4.5)

Figure 4.5 Scan tray with the scan tray cover and without the black protective base

NOTE: The sandwich of the HT Array Plate and the hybridization tray must remain in the hybridization oven until the Wash B buffer reaches the set point temperature during the initial setup in Step 2C..

2. Click **Next**.

   Figure 3.7 on page 24 displays the System Setup tab and the information in this pane.

   NOTE: If there is not enough disk space, a message is displayed. Delete or move .dat files to another location to free up enough disk space for the data that will be generated by eight Array Plates.

   The GeneTitan Single Channel has the following space requirements:

   - **96 Array Plate requires ~ 24 GB**
   - **24 Array Plate requires ~ 6 GB**
   - **16 Array Plate requires ~ 4 GB**

   The GeneTitan MC system has the following space requirements:

   - **96 Array Plate requires ~ 100 GB**
   - **24 Array Plate requires ~ 18 GB**
   - **16 Array Plate requires ~ 8 GB**

   A. Plate Information:

   - **Barcode**: Scan or manually enter the Array Plate barcode and click Next.
     The first six characters of the barcode identify the type of plate being loaded, the protocol GeneTitan Instrument will use to process the plate, and the imaging device parameters required for this type of plate.
   - **Protocol Name**: The protocol name is automatically selected. Click **Next**.

   B. Refill fluidics bottles with buffer (Table 4.1)

   1) Fill these bottles:

   - Wash A: fill with Wash Buffer A - keep at 2 L full
   - Wash B: fill with Wash Buffer B - keep at 1 L full
   - Rinse: fill with DI Water - keep at l L full

   2) Empty the waste bottle.

   3) Press the Confirmation button on GeneTitan Instrument to continue. A fluidics check is run (~ 1 minute).

   - Table 4.1 shows the minimum volumes of Wash A and B buffer and DI Water that are required for processing one or two plates.

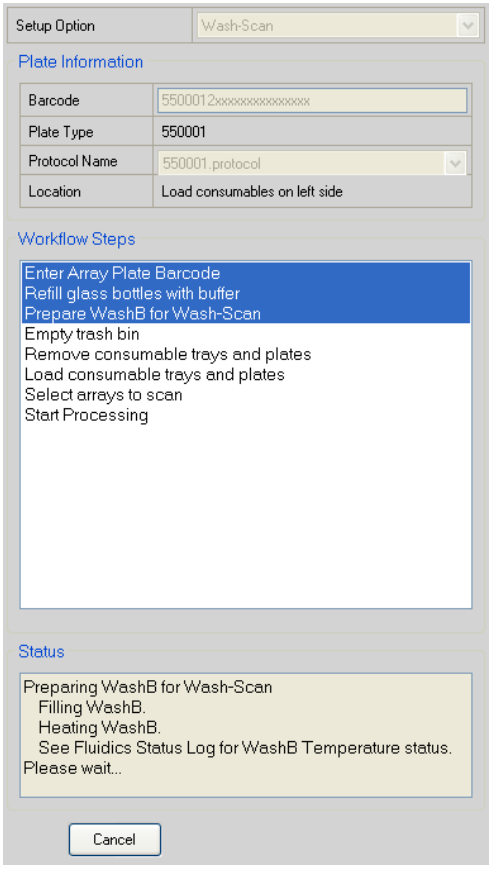
Table 4.1 The Minimum Volumes of Buffer and Rinse Required to Process on GeneTitan

Fluid Type	Amount Required for One Array Plate	Minimum Level in Bottle	
		One Array Plate	Two Array Plates
Rinse	300 mL	450 mL	900 mL
Wash A	~920 mL	1,040 mL +	2,000 mL
Wash B	300 mL	450 mL	600 mL

   C. During the initial setup, the application prompts you the system is warming the Wash B buffer to the preset temperature (Figure 4.6). When the Wash B target temperature is reached, the application prompts you to press the **Confirmation** button.

NOTE: The instrument control software will display a warning if it detects a problem during the fluid dispense operations. The filters in the GeneTitan Wash A, Wash B and DI Water bottles should be replaced if the software displays such a warning. Refer to *Replacing the Bottle Filters* on page 55 for the message displayed to the user and the procedure for replacing the filters.

Figure 4.6 Wash-B prep (For Wash-Scan workflow only)



D. Empty trash bin.

1) Open the trash bin and empty. If already empty, the trash bin remains locked and the Status pane reads “Trash bin is empty.”

2) Press the **Confirmation** button to continue.

E. Remove consumable trays and plates.

1) Remove used trays and plates when drawers open. If no consumables to remove, the Status window reads “Drawers are empty.”

2) Press the Confirmation button to continue.

F. Load consumable trays and plates as follows:

1) Follow the prompts in the Status window.

2) Once loaded, examine each cover for droplets of liquid.

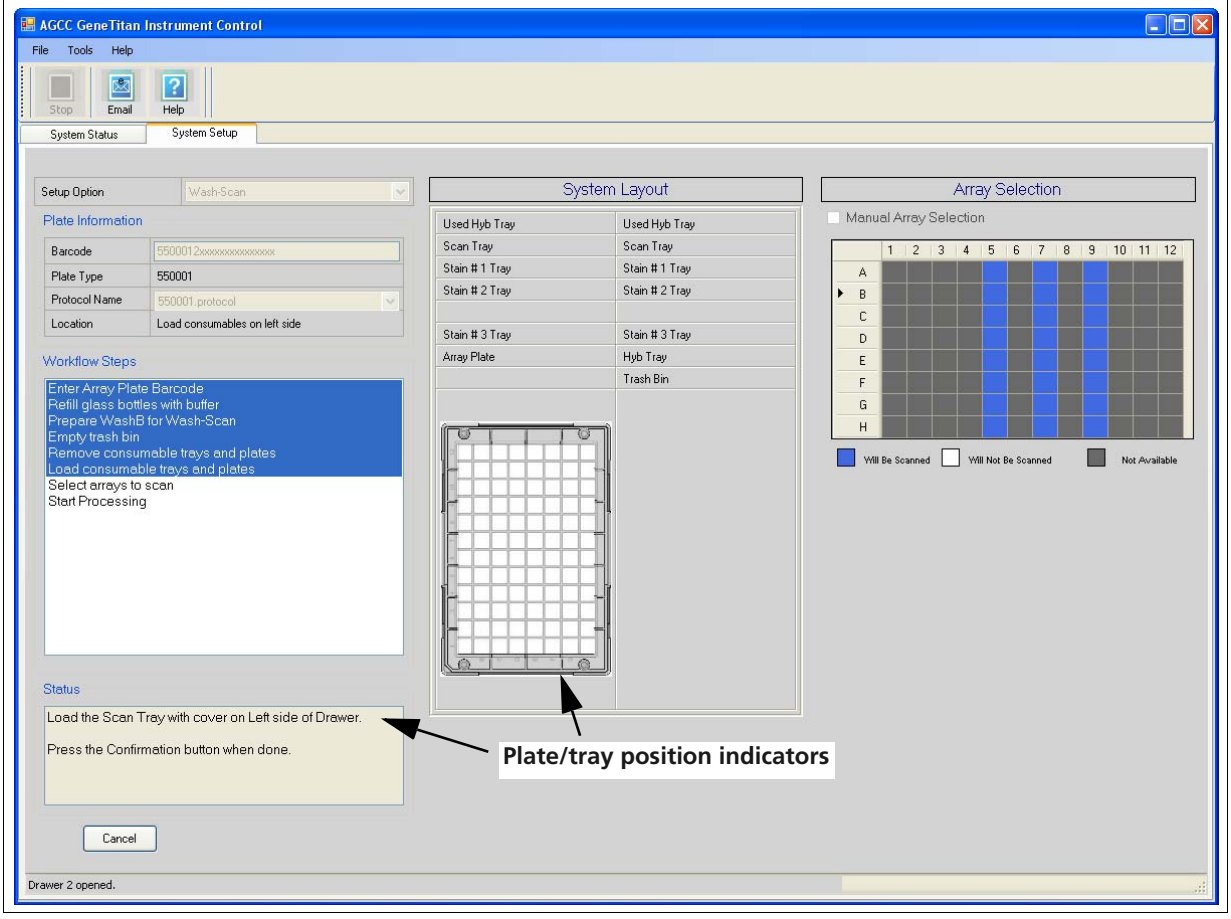
3) If any liquid is present, remove the tray, clean the cover and top of the tray with Kimwipes, and reload the tray.

CAUTION:

- **Orient trays as indicated by the guide inside the drawer. Improper orientation may cause the run to fail.**
- **Examine each cover for droplets of liquid after loading. Liquid on the cover can result in capillary phenomenon. As a result, the tray may stick to the cover and be lifted out of place inside the instrument.**

G. Follow the software prompts and load the array plate and trays as directed, pressing the **Confirmation** button after loading each tray or array plate.

Figure 4.7 Load Scan Tray

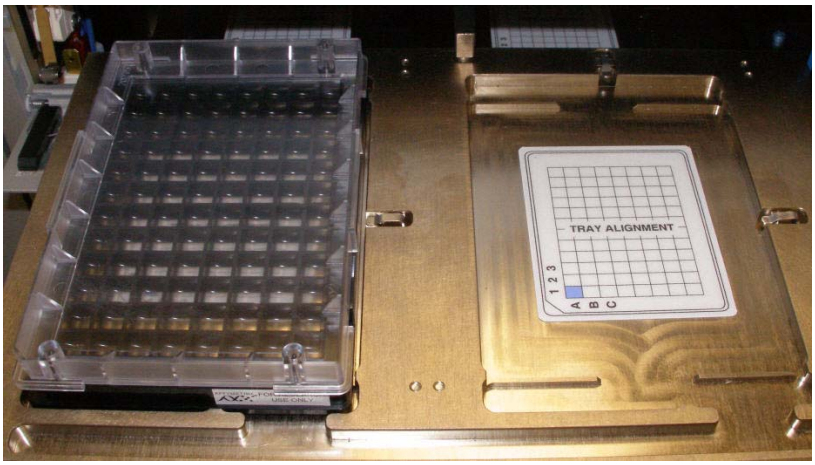


When you load the scan tray the internal bar code reader reads the barcode to see if it is the right kind of tray in the right orientation. If the information is correct, the application allows you to proceed to the next step. If not, the application will prompt you to load the correct tray into the instrument. Figure 4.8 and Figure 4.9 illustrate the proper way to install the tray.

You must load the scan tray with the scan tray cover as shown. You must load the scan tray into the instrument with the **Affymetrix For Research Use Only** label facing out towards you and the notch on the left-front side. The tray barcodes should be in the back, facing away from you and into the instrument.

Figure 4.8 Loading the scan tray and cover. The correct orientation in the loading of the scan tray into Drawer #2, the notch faces out and to the left. You must remove the black base.

Scan Tray with cover loaded in drawer 2.



Do **NOT** load the protective black base packaged with the Scan Tray.

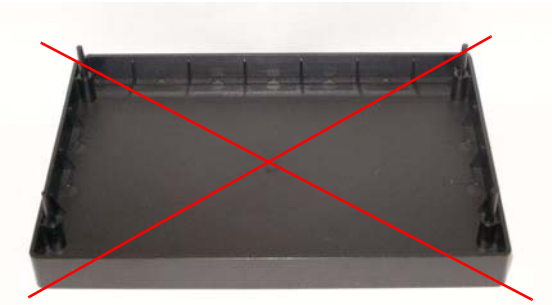
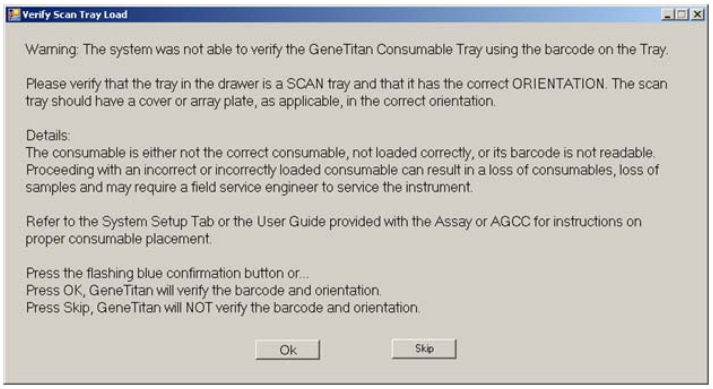


Figure 4.9 Loading the scan tray into Drawer #2

Figure 4.10 Confirm tray type

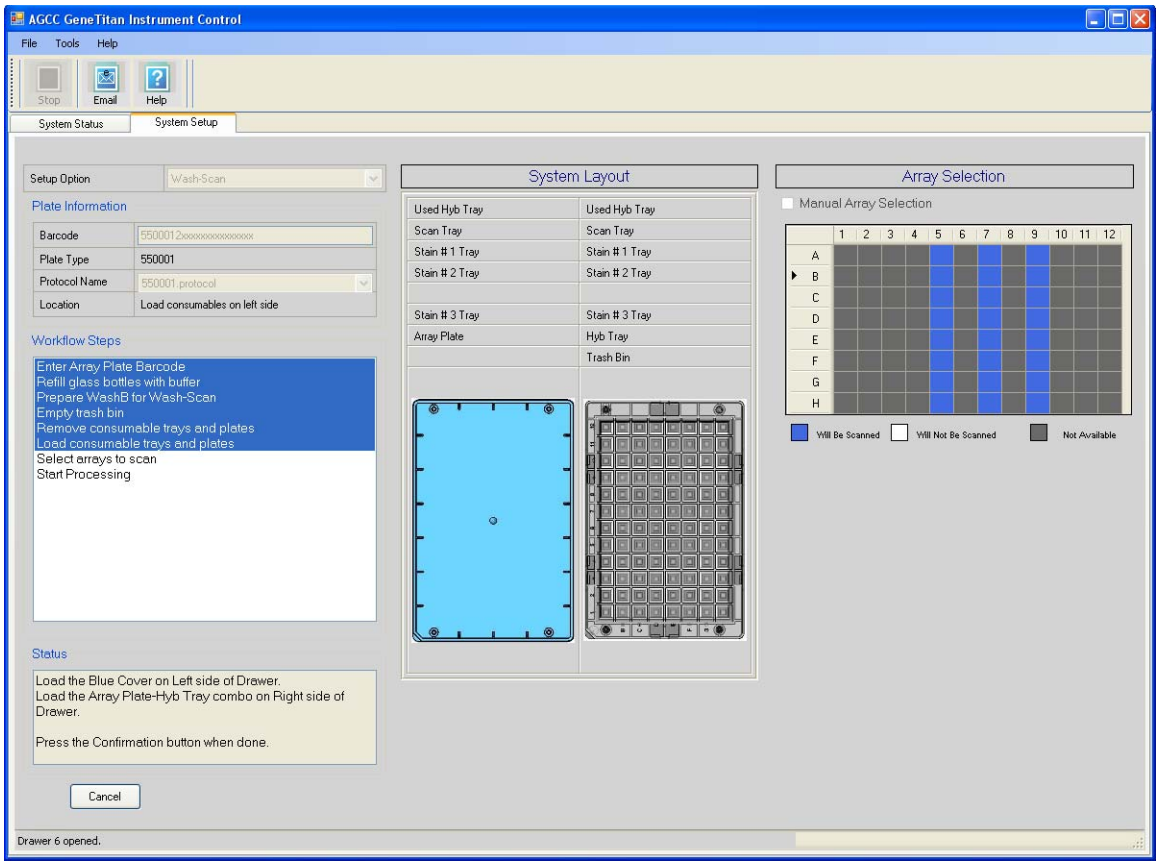

Verify Scan Tray Load
Warning: The system was not able to verify the GeneTitan Consumable Tray using the barcode on the Tray.
Please verify that the tray in the drawer is a SCAN tray and that it has the correct ORIENTATION. The scan tray should have a cover or array plate, as applicable, in the correct orientation.
Details:
The consumable is either not the correct consumable, not loaded correctly, or its barcode is not readable. Proceeding with an incorrect or incorrectly loaded consumable can result in a loss of consumables, loss of samples and may require a field service engineer to service the instrument.
Refer to the System Setup Tab or the User Guide provided with the Assay or AGCC for instructions on proper consumable placement.
Press the flashing blue confirmation button or...
Press OK, GeneTitan will verify the barcode and orientation.
Press Skip, GeneTitan will NOT verify the barcode and orientation.
Ok
Skip

3. Click **OK** or press the **Confirmation** button to continue or press the Skip button if the instrument has problems reading the barcode and after you have verified that the trays are placed in the proper orientation.

   The software prompts you to load the stain trays.

   After the trays have been loaded, the software prompts you to load the Array Plate on the Hyb Tray and the Array Plate cover (Figure 4.11).

Figure 4.11 Load Array Plate on Hyb Tray with cover

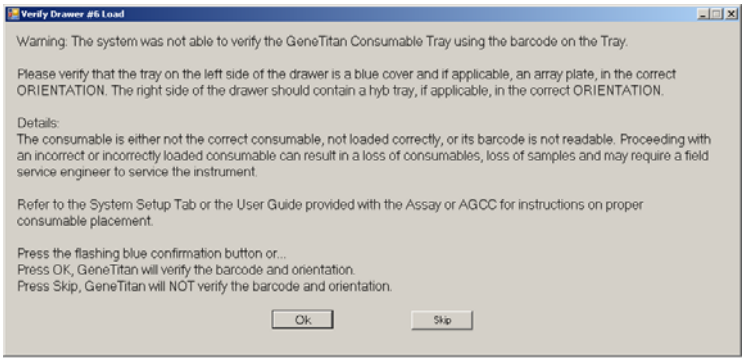


When you load the array plate on the Hyb Tray:

The internal bar code reader reads the barcode of the array plate and compares it with the barcode and the plate type specified in the Barcode field and Plate Type field on the Setup page.

If the information is correct, the application allows you to proceed to the next step. If the instrument is unable to read the barcode, it will push the tray out and will prompt you to load the correct plate with the proper orientation into the instrument (Figure 4.12).

Figure 4.12 Barcode error notice

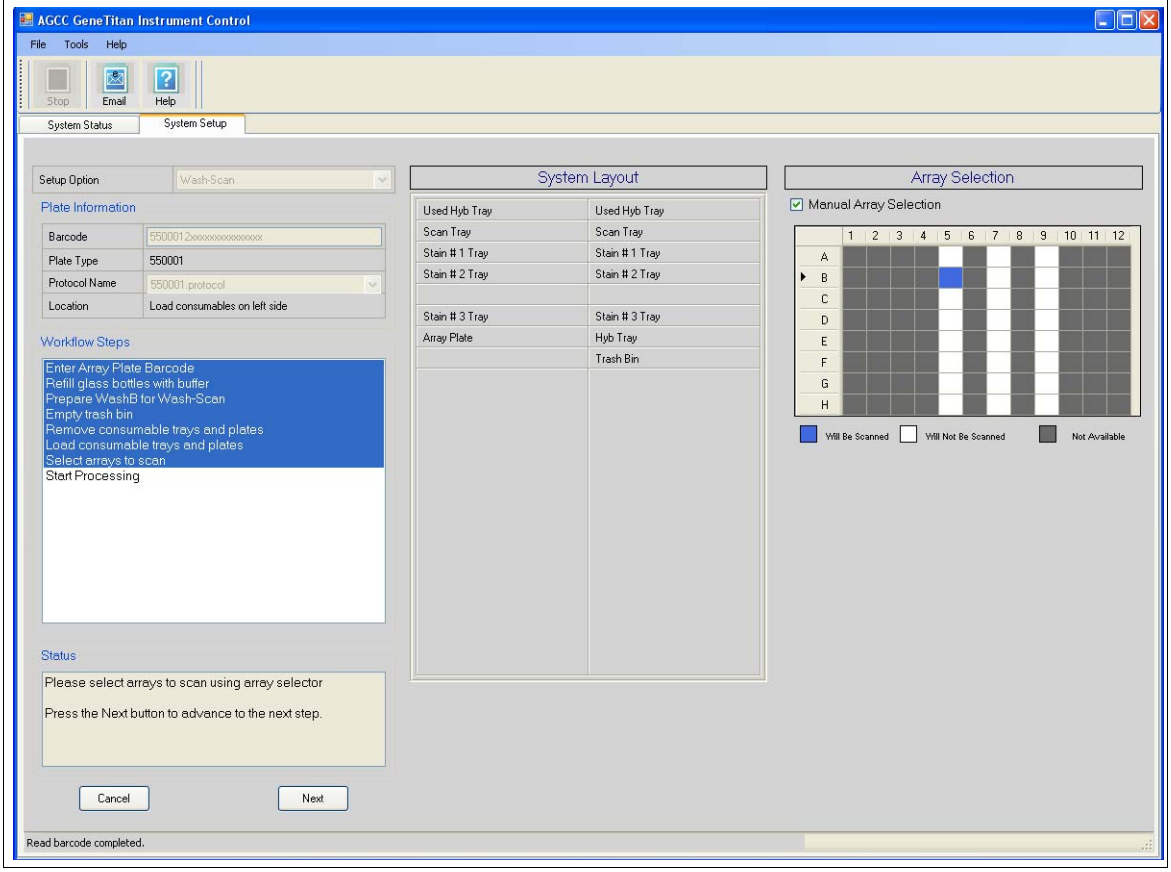

Verify Drawer #6 Load
Warning: The system was not able to verify the GeneTitan Consumable Tray using the barcode on the Tray.
Please verify that the tray on the left side of the drawer is a blue cover and if applicable, an array plate, in the correct ORIENTATION. The right side of the drawer should contain a hyb tray, if applicable, in the correct ORIENTATION.
Details:
The consumable is either not the correct consumable, not loaded correctly, or its barcode is not readable. Proceeding with an incorrect or incorrectly loaded consumable can result in a loss of consumables, loss of samples and may require a field service engineer to service the instrument.
Refer to the System Setup Tab or the User Guide provided with the Assay or AGCC for instructions on proper consumable placement.
Press the flashing blue confirmation button or...
Press OK, GeneTitan will verify the barcode and orientation.
Press Skip, GeneTitan will NOT verify the barcode and orientation.
Ok
Skip

4. Click **OK** to retry and check the loading of the array plate; or

   Click Skip if the instrument has problems reading the barcode and after verifying that the trays have been placed in the proper orientation.

   After the trays and plates have been loaded, the application prompts you to select the array(s) to be scanned (Figure 4.13). The application makes the default selection based on the barcode of the array plate. You can select the specific array to scan by overwriting the default selection. The default selection is all the pegs and they are selected by pressing the **<NEXT>** button.

Figure 4.13 Selecting array(s)



5. Use the default selections, or select arrays as described below:
   Each array on the plate is indicated by a single square.
   The color of the square indicates the array's status:

(dark blue)	Will be scanned.
(white)	Will not be scanned.
(gray)	Not available.

   To manually select arrays:

   A. Select the **Manual Array Selection** checkbox.

   B. Select the arrays to be scanned.

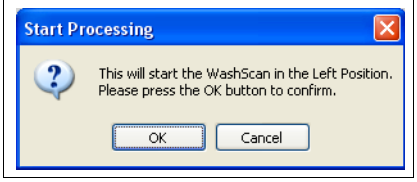
   You can select arrays by:

   - Clicking and dragging through the grid.
   - Pressing the **Ctrl** button down and clicking in different squares.

NOTE: If there is insufficient memory on the computer's hard drives to store the data from a plate, a notice appears.

6. Click **Next** to start the run.
   The Start Processing dialog box opens (Figure 4.14).

Figure 4.14 Start Processing notice



7. Click **OK** to begin the Wash-Scan workflow.

   The instrument performs the workflow steps for the Wash-Stain workflow and can be tracked in the Status window.

Scan Workflow

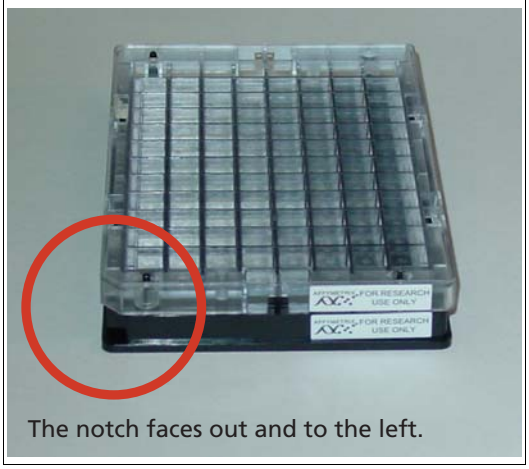
Loading Instrument for Imaging Workflow

The Scan Workflow allows you to scan the array plate on the GeneTitan Instrument Imaging Device. This mode allows you to bypass the hybridization and wash-stain step of the process workflow. You can scan only one array plate at a time.

You must load the array plate and scan tray as shown in Figure 5.1, Figure 5.2 and Figure 5.4. You must load the array plate and scan tray into the instrument with the **Affymetrix For Research Use Only** label facing the out towards you and the notch on the left-front side. The tray barcodes should be in the back, facing away from you and into the instrument.

Figure 5.1 Array Plate with Scan Tray showing the part numbers and barcodes. The part numbers and barcodes face into the instrument.

Figure 5.2 Array Plate with Scan Tray showing the notch and the Affymetrix For Research Use Only. These face out towards you.

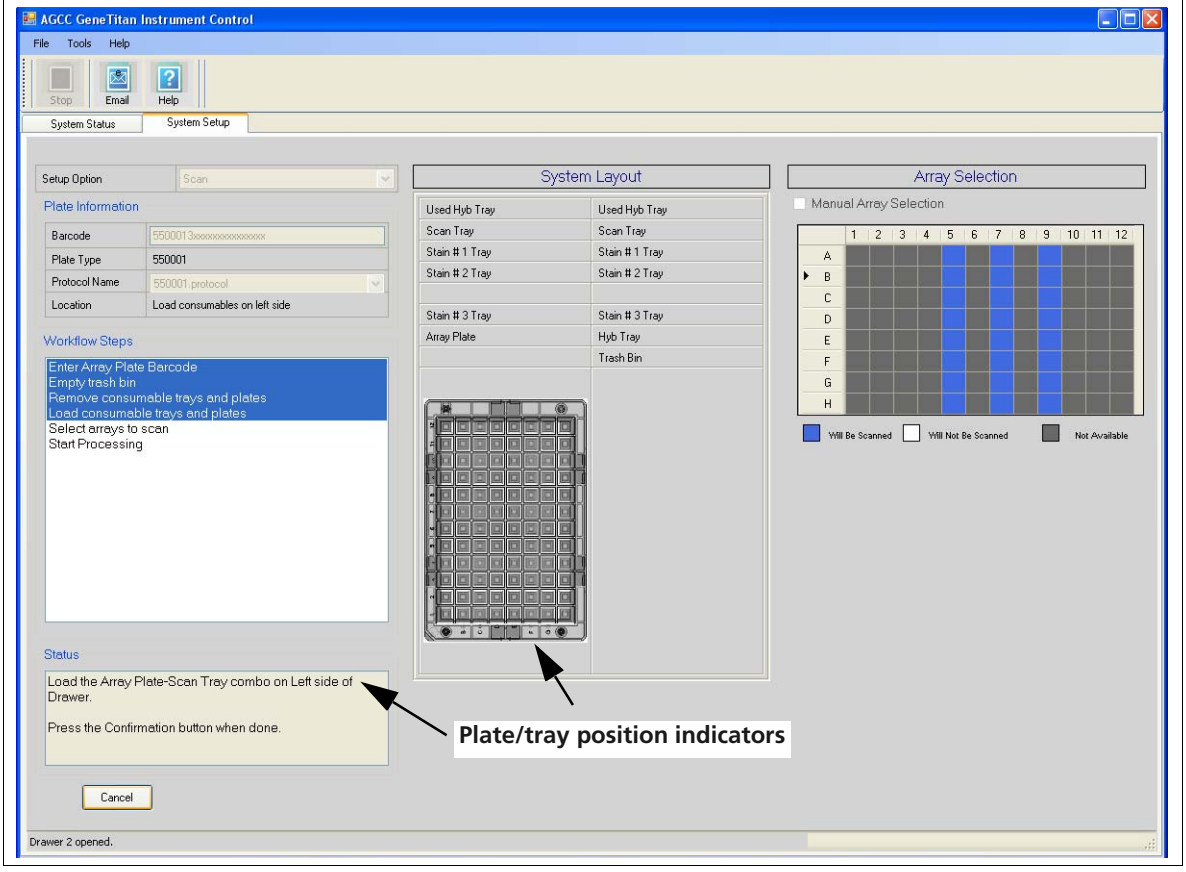


To load the Array Plate and Scan Tray:

1. Select **Scan** for the Setup Option.

   The application opens the Input/Output drawer #2 and prompts you to load the array plate-scan tray combo on the drawer.

Figure 5.3 Load Array Plate -Scan Tray prompt



2. Load the array plate-scan tray combo into the **indicated** side of the drawer (Figure 5.4) and press the **Confirmation** button.

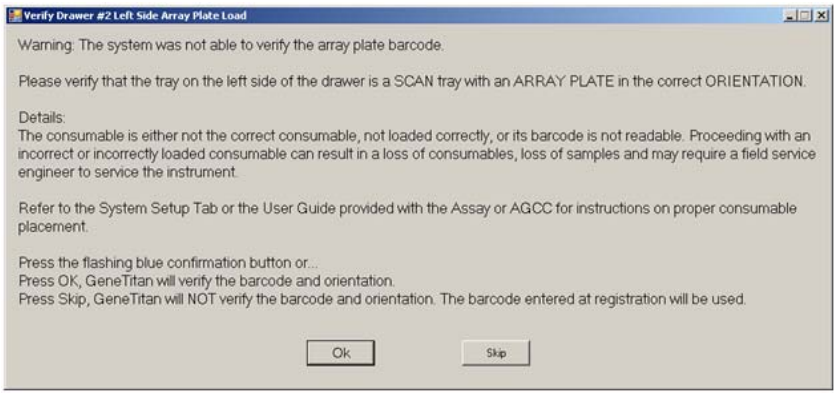
IMPORTANT: When running a series of array plates through the Scan workflow, you must be careful to remove and load the proper array plate and pay careful attention to the software prompts that tell you which side of the open drawer to remove or place the plate.

Figure 5.4 Loading Array plate on scan tray in drawer # 2

The internal bar code reader reads the barcode of the array plate then compares it with the barcode and the plate type specified in the Barcode field and Plate Type field on the Setup page.

If the information is correct, the application allows you to proceed to the next step. If not, the application will prompt you to load the correct plate into the instrument (Figure 5.5).

Figure 5.5 Barcode error notice

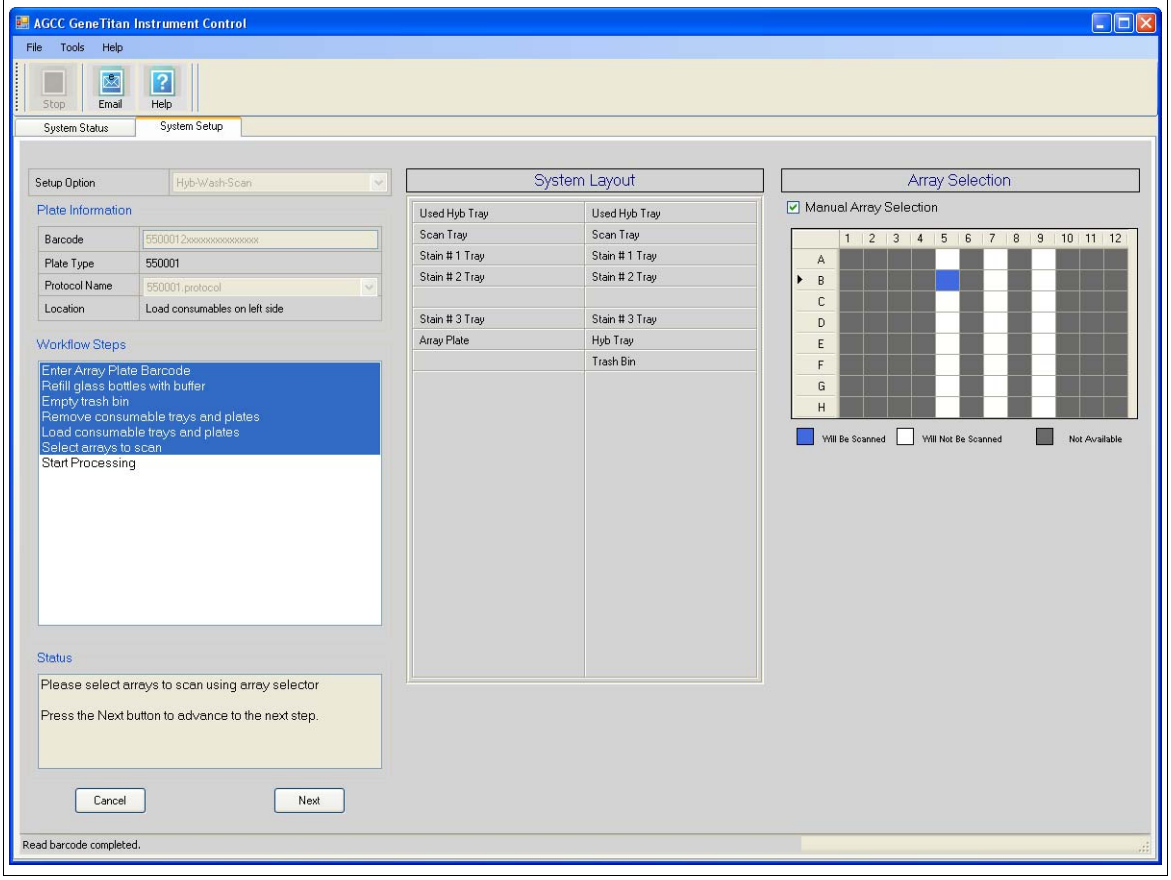

Verify Drawer #2 Left Side Array Plate Load
Warning: The system was not able to verify the array plate barcode.
Please verify that the tray on the left side of the drawer is a SCAN tray with an ARRAY PLATE in the correct ORIENTATION.
Details:
The consumable is either not the correct consumable, not loaded correctly, or its barcode is not readable. Proceeding with an incorrect or incorrectly loaded consumable can result in a loss of consumables, loss of samples and may require a field service engineer to service the instrument.
Refer to the System Setup Tab or the User Guide provided with the Assay or AGCC for instructions on proper consumable placement.
Press the flashing blue confirmation button or...
Press OK, GeneTitan will verify the barcode and orientation.
Press Skip, GeneTitan will NOT verify the barcode and orientation. The barcode entered at registration will be used.
Ok
Skip

3. Click **OK** to retry and check the loading of the array plate; or

   Click **Skip** if the instrument has problems reading the barcode and after verifying that the trays have been placed in the proper orientation.

   The application prompts you to select the array(s) to be scanned (Figure 5.6). The application makes the default selection based on the barcode of the array plate. You can select the specific array to scan by overwriting the default selection.

Figure 5.6 Selecting array(s)



4. Use the default selections, or select arrays as described below:
   Each array on the plate is indicated by a single square.
   The color of the square indicates the array's status:

(dark blue)	Will be scanned.
(white)	Will not be scanned.
(gray)	Not available.

   To manually select arrays:

   A. Select the **Manual Array Selection** checkbox.

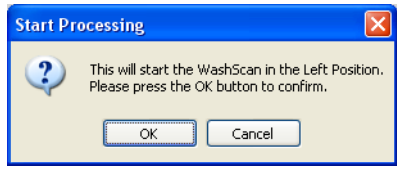
   B. Select the arrays to be scanned.
   You can select arrays by:
   - Clicking and dragging through the grid.
   - Pressing the **Ctrl** button down and clicking in different squares.

   C. Click **Next**.

NOTE: If there is insufficient memory on the computer's hard drives to store the data from a plate, a notice appears.

5. Click the **Next** button to start the run.
   The Start Processing dialog box opens (Figure 5.7).

Figure 5.7 Start Processing notice



6. Click **OK** to begin the Scan workflow.

   The instrument performs the workflow steps for Scan and can be tracked in the Status window.

Running Multiple Workflows at the Same Time for Expression Arrays

When processing expression arrays, the GeneTitan Instrument can run two different workflows at the same time. This enables you:

- To load a series of array plates with hyb trays and consumables for the Hyb-Wash-Scan workflow to process arrays more quickly.

> **IMPORTANT:** You cannot load Genotyping and Expression array plates at the same time.

- To run an array plate that was processed using a different system through the scan workflow while another array plate is going through earlier stages of the Hyb-Wash-Scan workflow.

Only certain types of workflows can be run at the same time, and delays may be necessary before starting the second workflow. These restrictions exist because an array plate should be scanned immediately after the wash and stain processing is finished, and GeneTitan scans one array plate at a time.

If you want to run a series of Expression array plates through the Hyb-Wash-Scan workflow, you will need to wait for up to five hours after you start the first workflow before loading the second array plate, hyb tray, and consumables, to allow the first array plate to finish being scanned.

When running a series of Expression array plates, there are restrictions on the sorts of arrays you can run through in a series because of:

- Differences between the workflow for 3' IVT and WT Expression arrays
- The number of arrays on a plate

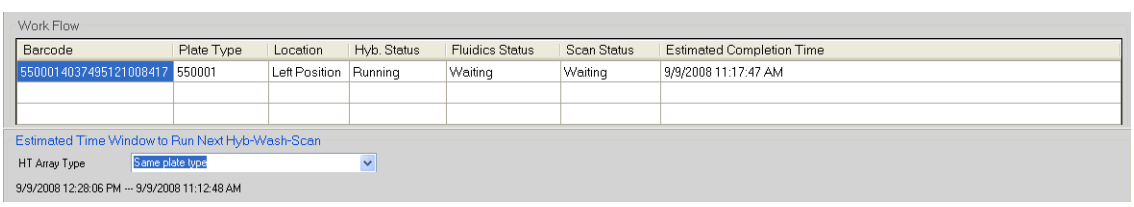
There are limitations on your ability to mix array plates with different numbers of arrays, due to timing differences in the scan and other issues.

GeneTitan can process array plates with 16, 24, or 96 arrays on a plate. The delay time varies depending upon the number of arrays on the first array plate:

- Approximately five hours if the first array is a 96-array plate
- Approximately two and a half hours if the first array is a 16 or 24-array plate

The Workflow pane of the System Status screen (Figure 5.8) displays the time you need to wait before beginning a second workflow. The instrument will show prompts on plate load time based on the plate you run first.

Figure 5.8 Workflow pane



NOTE: The times shown will differ for 3'IVT and WT Expression arrays.

If you are performing the Hyb and Wash processes on array plates in a different system, you can load a second array plate for the scan workflow shortly after you begin a hyb-wash-scan workflow. The Scan workflow option will not be available when there is not enough time to finish the scan workflow before the first array plate finished the wash and stain process.

Running the Scan Workflow with Other Workflows

You can load an array plate and scan tray for the scan workflow while another array plate is being run through the Hyb-Wash-Scan workflow. After starting the first workflow you will need to wait a few minutes before loading the array plate and scan tray for the second workflow.

IMPORTANT: When running the Scan workflow while another workflow is running, you must be careful to remove and load the proper array plate and pay careful attention to the software prompts that tell you which side of the open drawer to remove or place the plate.

GeneTitan® Instrument Care and Troubleshooting

GeneTitan® Instrument Care

This chapter provides instructions on caring for and maintaining the instrument and on troubleshooting if problems arise.

- Always run a Shutdown protocol when the instrument will be off or unused overnight or longer. This will prevent salt crystals from forming within the Fluidics system.
- Always use deionized water to prevent contamination of the lines. Change buffers with freshly prepared buffer at each system startup.

The GeneTitan® Instrument should be positioned on a sturdy level bench away from extremes in temperature and away from moving air.

IMPORTANT: Before performing maintenance turn off power to the instrument to avoid injury in case of an electrical malfunction.

Cleaning and Maintenance

The GeneTitan family of instruments require little in the way of customer maintenance. The instruments must be kept clean and free of dust. Dust buildup can degrade performance. Wipe the exterior surfaces clean using a mild dish detergent solution in water. Do not use ammonia based cleaners or organic solvents such as alcohol or acetone to clean the system because they may damage the exterior surfaces.

The following tasks should be performed regularly to ensure the Imaging Device remains in working order.

Monthly

Wipe down the outer surface of the Imaging Device with a dry cloth.

Every Six Months

Replace the cooling fan air filters at the rear of the instrument.

Replace the Micropore filters in the Wash A, Wash B, and Rinse bottles. If you run 4-8 plates/week then the micro-pore filters need to be replaced more frequently.

Servicing the Outer Enclosure Fan Filters

Cleaning Schedule

The GeneTitan fan filter cartridge (Figure A.1) should be cleaned at least every 90 days of service. Note that in some service locations, the presence of excessive dust or particulate matter may necessitate cleaning the cartridge more often than 90 days.

A plugged filter cartridge can cause excessive temperatures within the machine that can cause unwanted evaporation on test media.

Part details:

Affymetrix P/N: 01-0669

Number of parts per assembly: 3

Figure A.1 The GeneTitan filter cartridge

Cleaning Procedure

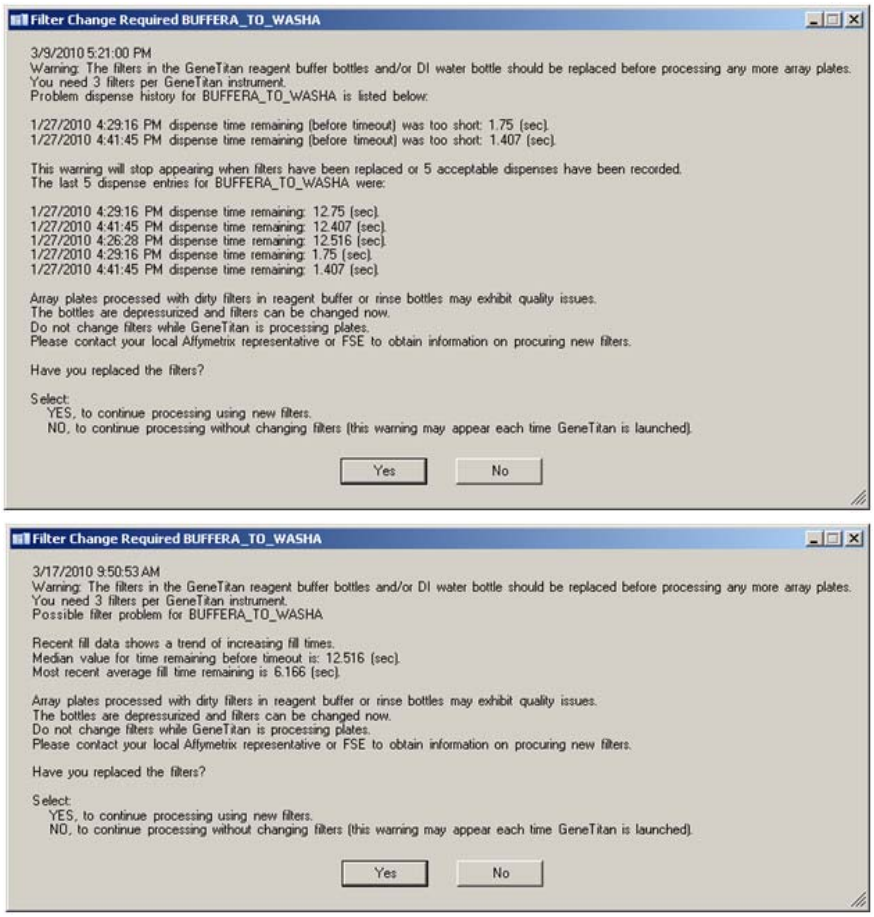
1. Slide the filter cartridge from the fan filter cartridge at the rear of the GeneTitan Instrument.
2. Submerse in clean DI water. Rinse and agitate gently to dislodge material.
3. Remove from water and dry with clean compressed air or towels.
4. When the filter cartridge is completely dry to the touch, re-install the cartridge.

Replacing the Bottle Filters

The bottles used in GeneTitan Instrument contain a filter to remove particulates that may exist in the buffers and DI water. The filters in the GeneTitan fluidics bottles (Wash A, Wash B and DI Water) need to be replaced when the filters are clogged. The software displays warning message boxes for the filter in each reagent bottle when it detects a problem or shows a trend of increased fill times during fluid fill operations.

If an error is detected as described above, then a message box titled “Filter Change Required” is displayed along with the information on the specific dispense operation. You should change all three filters when a warning is displayed for any one of the three filters.

Figure A.2


Filter Change Required BUFFERA_TO_WASHA
3/9/2010 5:21:00 PM
Warning: The filters in the GeneTitan reagent buffer bottles and/or DI water bottle should be replaced before processing any more array plates.
You need 3 filters per GeneTitan instrument.
Problem dispense history for BUFFERA_TO_WASHA is listed below:
1/27/2010 4:29:16 PM dispense time remaining (before timeout) was too short: 1.75 (sec).
1/27/2010 4:41:45 PM dispense time remaining (before timeout) was too short: 1.407 (sec).
This warning will stop appearing when filters have been replaced or 5 acceptable dispenses have been recorded.
The last 5 dispense entries for BUFFERA_TO_WASHA were:
1/27/2010 4:29:16 PM dispense time remaining: 12.75 (sec).
1/27/2010 4:41:45 PM dispense time remaining: 12.407 (sec).
1/27/2010 4:26:28 PM dispense time remaining: 12.516 (sec).
1/27/2010 4:29:16 PM dispense time remaining: 1.75 (sec).
1/27/2010 4:41:45 PM dispense time remaining: 1.407 (sec).
Array plates processed with dirty filters in reagent buffer or rinse bottles may exhibit quality issues.
The bottles are depressurized and filters can be changed now.
Do not change filters while GeneTitan is processing plates.
Please contact your local Affymetrix representative or FSE to obtain information on procuring new filters.
Have you replaced the filters?
Select:
YES, to continue processing using new filters.
NO, to continue processing without changing filters (this warning may appear each time GeneTitan is launched).
Yes
No
Filter Change Required BUFFERA_TO_WASHA
3/17/2010 9:50:53 AM
Warning: The filters in the GeneTitan reagent buffer bottles and/or DI water bottle should be replaced before processing any more array plates.
You need 3 filters per GeneTitan instrument.
Possible filter problem for BUFFERA_TO_WASHA
Recent fill data shows a trend of increasing fill times.
Median value for time remaining before timeout is: 12.516 (sec).
Most recent average fill time remaining is 6.166 (sec).
Array plates processed with dirty filters in reagent buffer or rinse bottles may exhibit quality issues.
The bottles are depressurized and filters can be changed now.
Do not change filters while GeneTitan is processing plates.
Please contact your local Affymetrix representative or FSE to obtain information on procuring new filters.
Have you replaced the filters?
Select:
YES, to continue processing using new filters.
NO, to continue processing without changing filters (this warning may appear each time GeneTitan is launched).
Yes
No

The message boxes displayed in Figure A.2 will provide information on fluid dispense errors that were detected by the instrument for any of the bottles or when the instrument detects an increase in the amount of time that is required to perform the fill operations.

NOTE: The reagent bottles are depressurized when this warning message is displayed. It is safe to change the filters in all three fluidic bottles when this message is displayed.

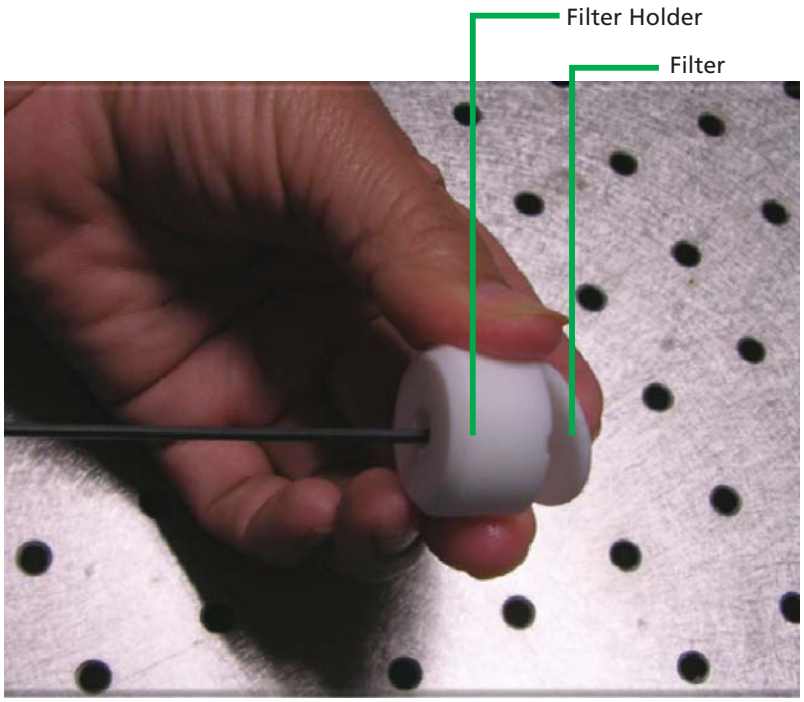
After changing the filters in all three bottles using the procedure described below, please press the **Yes** button to continue. If you choose to ignore the error message, press the **No** button. This warning message will be displayed each time AGCC instrument control software is launched. You may also experience data quality issues if particulate matter cannot be trapped by the filters if they are clogged.

We recommend that your site keep three spare filters in the event they need to be replaced. The procedure for replacing the filters is simple.

Part details:

Affymetrix P/N: 01-0671

Figure A.3 Replacing the Filter



Removing and inspecting the Filter

1. Loosen and remove the cap on the bottle.
2. Carefully remove the filter from the end of the filter body. Use a firm stick to remove the filter from the end of the filter holder.
3. Visually inspect the filter. If one of the filters appears to have a concentration of dirt or contaminate in it, discard it and obtain a new one.

Replacing the Filter

1. Insert the filter into the end of the filter body.
2. Replace the cap onto the bottle and tighten it.
3. Repeat for each bottle.

IMPORTANT: **Replace one filter at a time to ensure the correct connection of the buffer supply tube to its respective bottle. The color of the buffer supply tubing matches the bottle color code.**

Replacing the Xenon Lamp in the GeneTitan MC Instrument

This section applies to your site only if you have the GeneTitan Multi-Channel (MC) instrument. The GeneTitan MC uses a xenon arc lamp system that is warranted for 500 hours to provide illumination for imaging the array at two wavelengths. The xenon lamp has a limited lifetime and needs to be replaced at regular intervals. The GeneTitan Instrument Control software provides a timer that indicates the remaining useful life of the bulb and notifies you when it requires replacement. It is important to adhere to the warnings specified in the GeneTitan MC User Guide. Refer to the GeneTitan MC Instrument User Guide, P/N 08-0308, or Appendix F, GeneTitan® MC Instrument Care for details on replacing the lamp. Refer to the GeneTitan MC Instrument User Guide, P/N 08-0308, for the Lambda LS and Smart controller system. The Lamp and the controller should NEVER be switched ON or OFF manually. The GeneTitan MC instrument control software manages the lamp activity and will switch the lamp ON and OFF as required. It takes 10 minutes to warm-up the lamp. In idle mode the lamp will remain ON for 2 hours before it is automatically switched OFF and if there are no more plates being transferred from the fluidics to the imaging station. This is by design and intended behavior. Please do not try to save the lamp life by turning OFF the switch on the lamp. After the normal life expectancy of the lamp has expired, the software application will alert you to the requirement to replace the lamp. This procedure is simple but you must follow good health and safety precautions.

Affymetrix Part Number: 01-0740

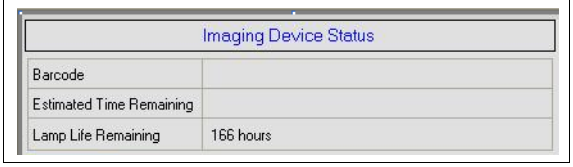
NOTE: The power switch on the shutter box should be ON at all times. The OPEN/CLOSE switch on the shutter box should be at AUTO position at all times.

Lamp Life/Imaging Device Status Notices

The Imaging Status pane displays lamp life and Imaging Device status notices for the GeneTitan MC.

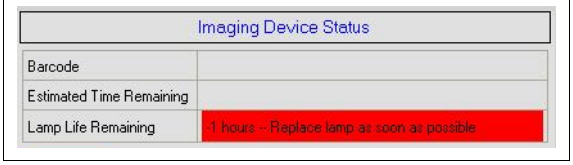
In normal operation, the pane displays the hours of life left in the lamp:

Figure A.4 Lamp Life above tolerance



It displays a red or yellow notice when the lamp life is getting short:

Figure A.5 Lamp Life above tolerance



It also displays a red notice when the Imaging Device is offline:

Figure A.6 Imaging Device Offline

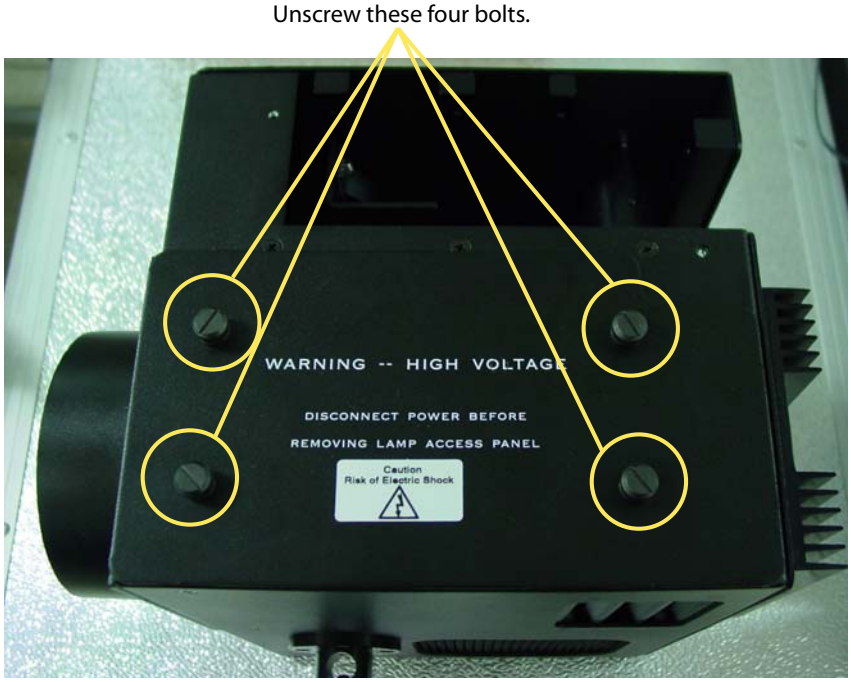
NOTE: The 300 Watt Xenon lamp in the GeneTitan MC instrument is warranted for 500 hours. To replace the lamp refer to the instructions in the GeneTitan instrument manual. After changing the lamp, it is necessary to reset the lamp life clock manually.

WARNING: You must turn off the lamp using the power switch in the rear of the unit and remove the power cord. Allow the lamp to cool before attempting to replace the lamp

Removing the Xenon Lamp

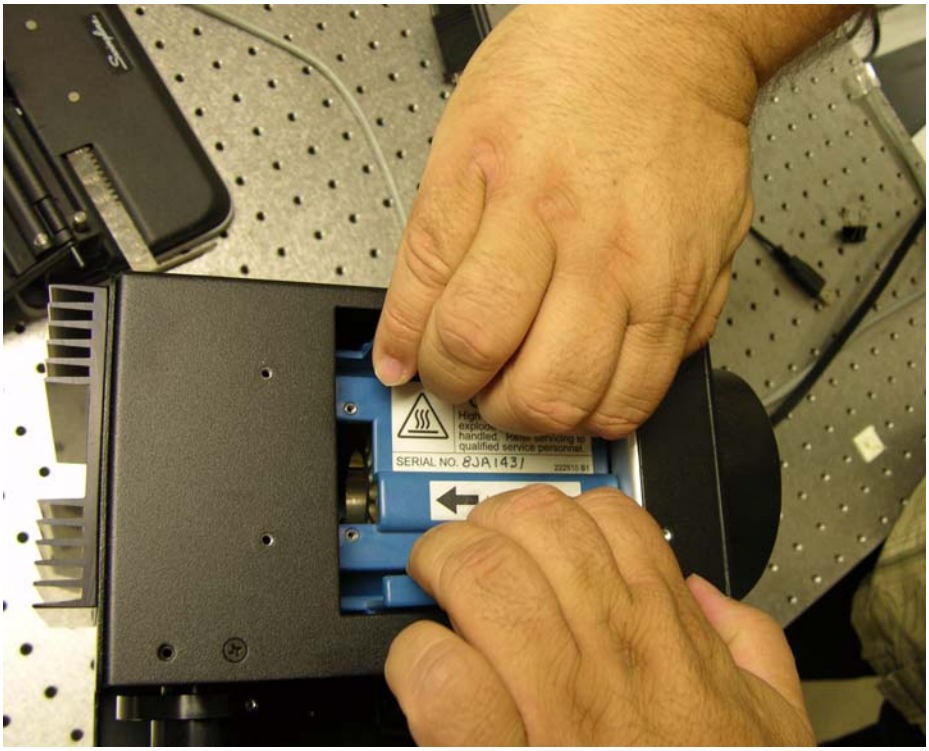
1. Unscrew the four retaining bolts. They should be finger tight (Figure A.7).

Figure A.7 Unscrewing the Bolts



2. Place each hand on each side of the blue plastic flange and lift out the lamp in a vertical motion (Figure A.8). You must use both hands to remove the lamp successfully. Apply equal pressure on each side of the lamp and gently lift.

Figure A.8 Lifting out the lamp



Replacing the Lamp

CAUTION: Ensure that you install the lamp in the correct orientation.

1. Hold the lamp by the blue plastic flanges. Ensure that the lamp bulb faces inward toward the reflecting mirror (Figure A.9) and vertically insert the lamp (Figure A.10).
2. Replace the warning cover and hand tighten the bolts (Figure A.7).

Figure A.9 The Reflecting mirror

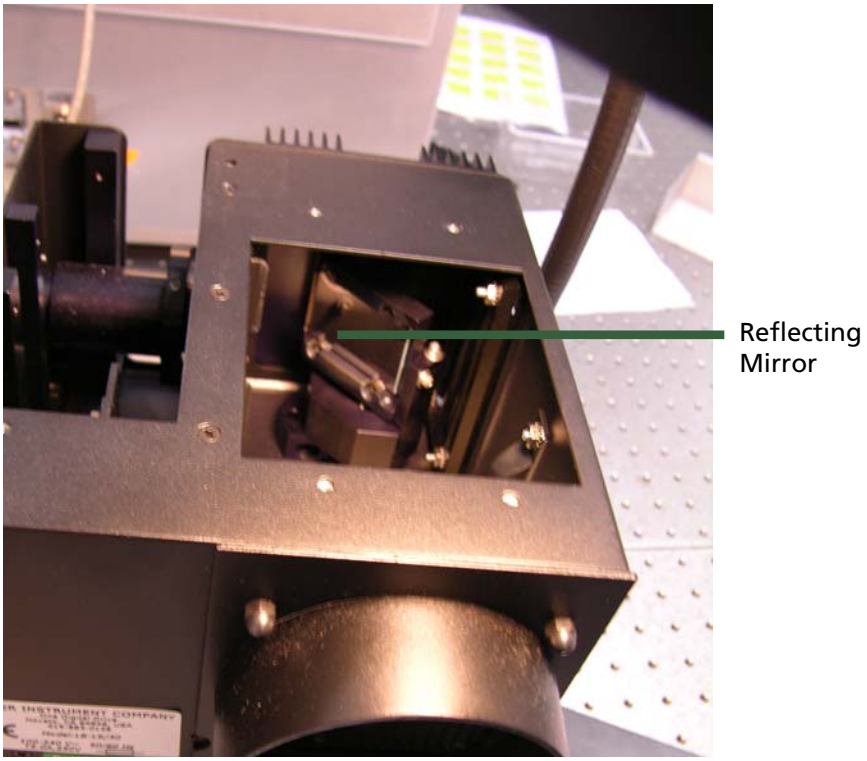
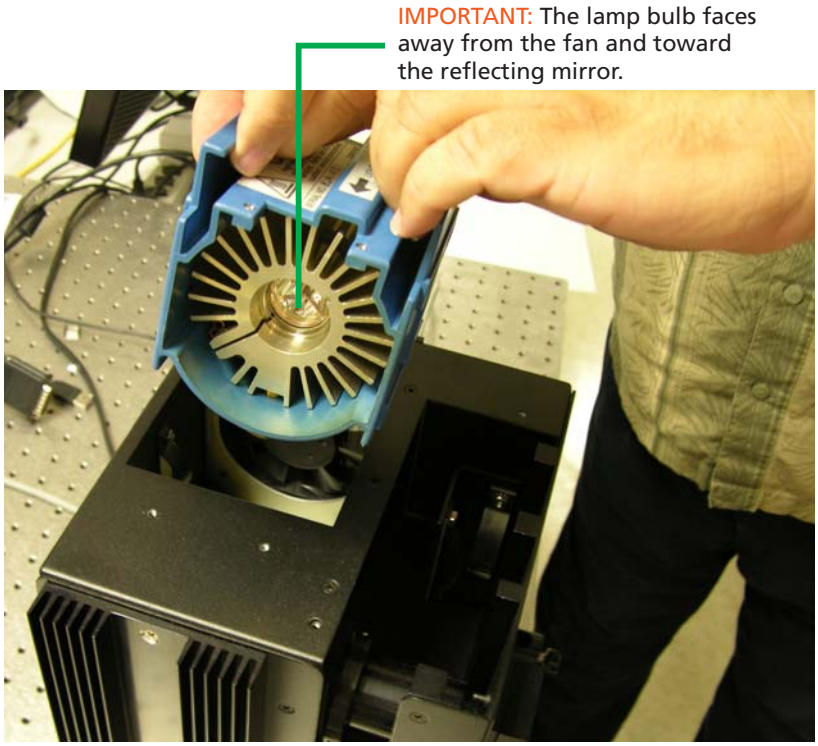


Figure A.10 Inserting the Lamp

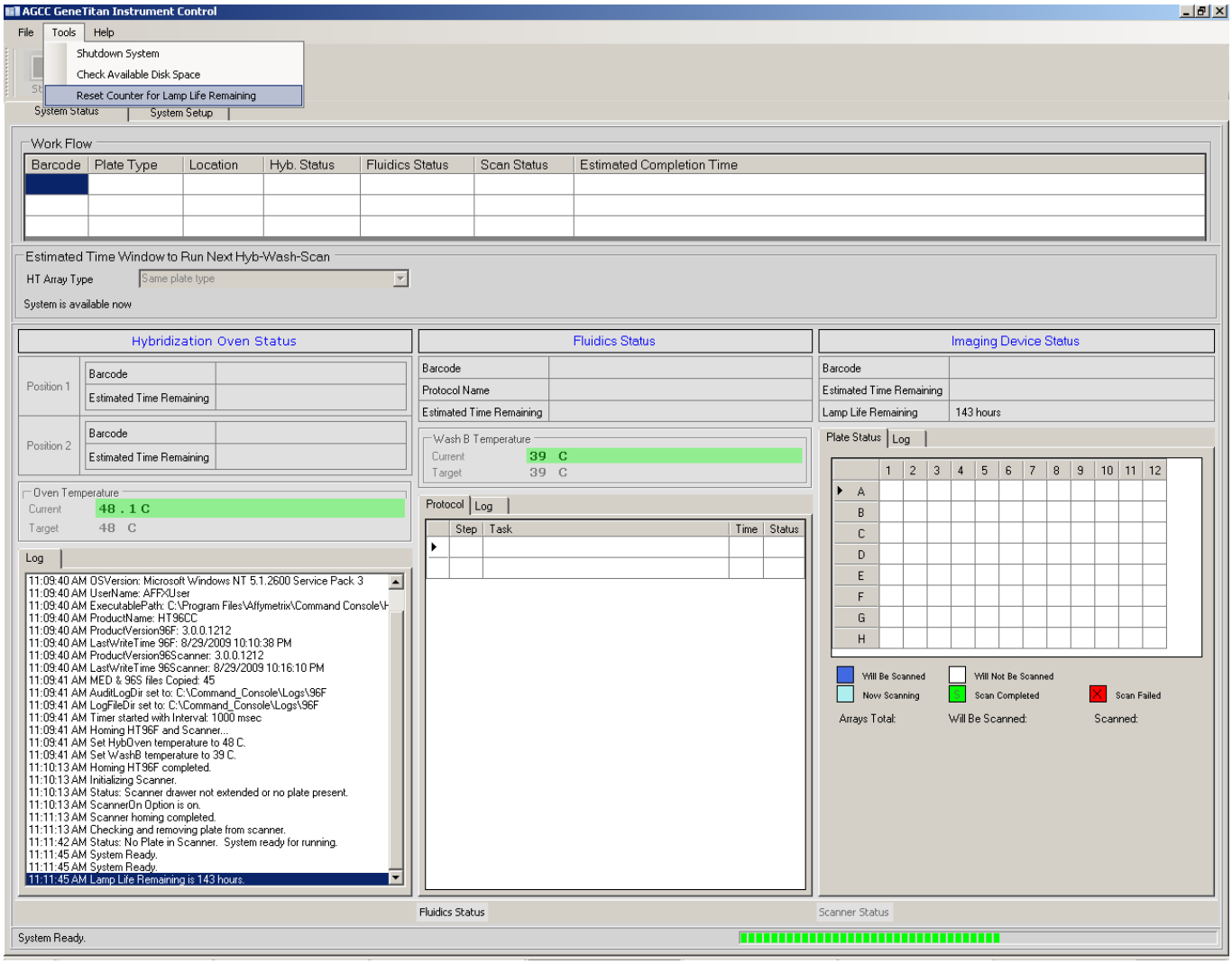


Resetting the Lamp Counter

You must alert the software application that you have replaced the lamp so that the hours of the lamp counter are reset to zero.

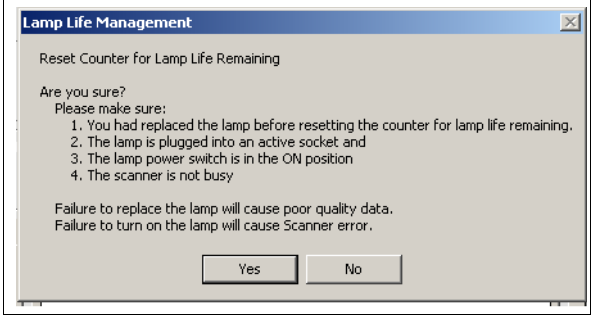
1. On the software application click **Tools** → **Reset Counter for Life Remaining** (Figure A.11). This menu option is available only if the system is not processing any plate.

Figure A.11 Inserting the Lamp



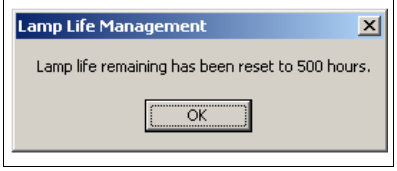
2. The software will display a message that allows you to change your mind.

Figure A.12 Are you Sure?


Lamp Life Management
Reset Counter for Lamp Life Remaining
Are you sure?
Please make sure:
1. You had replaced the lamp before resetting the counter for lamp life remaining.
2. The lamp is plugged into an active socket and
3. The lamp power switch is in the ON position
4. The scanner is not busy
Failure to replace the lamp will cause poor quality data.
Failure to turn on the lamp will cause Scanner error.
Yes
No

3. Click **Yes** if you want to reset the counter. The software will display a message that confirms that the software has reset the counter (Figure A.13).

Figure A.13 The counter is reset.



Troubleshooting

This section provides instructions on how to identify and solve simple problems with the GeneTitan MC Instrument. If a problem or error occurs that is not listed in this chapter contact a Affymetrix technical support for assistance.

For software errors that do not involve hardware crashes the most common solution is to shut down the application and then restart it. If the same error occurs shut down both the application and the computer and then restart. If it still occurs shut down the GeneTitan MC Instrument and then restart.

Log Files

The log files are produced by different AGCC components. The logs provide a record of the tasks performed by different components, such as the migration tools and installer. These log files provide useful information for troubleshooting problems. These files may be requested by your field application specialist (FAS), field service engineer (FSE), or the Affymetrix call center.

AGCC Log Files

The following files apply to the GeneTitan Instruments. All the AGCC log files from C:\Command_Console\Logs The different log files include:

Systemlog.XML	XML file with system information.
DEC.log	Text file with information on the use of the Data Exchange Console.
DECError.log	Text file with information on errors created while using DEC.
AGCC_LibFileImporter. log (with date and time code)	Text file with info on use of the Library File Importer.

Other AGCC Files

Your FAS and/or FSE may request you to send the following files for troubleshooting:

1. Library files (*.PARAMS, *.MASTER, *.WORKFLOW, *.SMD, *.MEDIA) located in C:\Command_Console\Library, excluding the large analysis library files (CDF, PSI, GRC).
2. Provide a list of all sub folders and their contents under the library files folder located in C:\Command_Console\Library. Please ensure there are no duplicate library files, as these can cause problems.
3. AGCC system configuration file located at C:\Command_Console\Configuration\Calvin.System.config
4. Pending job order files located in C:\Command_Console\Jobs
5. Other AGCC related information, such as:
   - **A.** The number of files under C:\Command_Console\Data, including sub directory.
   - **B.** If the system is a networked system or a standalone system.
   - **C.** Other applications installed on the system, such as antivirus application, MS Office, Internet Explorer versions.

AGCC Log Files for GeneTitan MC Systems

Log files for the GeneTitan MC Instrument control processes are placed in subdirectories of the Command Console\Logs\ folder. Affymetrix may need the following files for troubleshooting:

GeneTitan MC Fluidics

1. C:\Command_Console\Logs\96F\
   - A. subdirectories named by date (e.g., Log7-29-2009)
     - 1) Collect all dated directories and contents since the GeneTitan application was started, not just the date of the event (some logging goes into files from the date the application started so this can be critical for us).
     - 2) Absolutely required are all the log directories from the date the run was started to the date of the event.
2. C:\Command_Console\Logs\96F\FluidicErrorLog - all files in this directory

GeneTitan MC Imaging Device

1. C:\Affymetrix\GeneChipHTScanControlMC\Log - collect all dated directories and contents since the GeneTitan application was started
2. C:\Affymetrix\GeneChipHTScanControlMC\RunLog - collect all dated directories and contents since the GeneTitan application was started

Problems and Solutions

This section provides instructions on how to identify and solve problems with the unit.

If problems arise with the instruments use the following tables to locate the description that matches the problem. If you cannot find a solution call Affymetrix technical support for assistance.

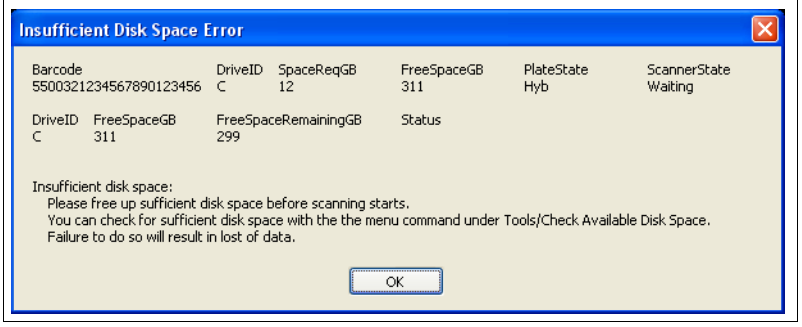
For software errors that do not involve hardware crashes the most common solution is to shut down the application and then restart it. If the same error occurs shut down both the application and the computer and then restart. If it still occurs shut down the entire unit and then restart.

Insufficient Disk Space Notice

If there is not enough memory on the computer's drives to save the data from an array plate, a notice appears when:

- You first initialize the software and instrument
- You select arrays for imaging.

Figure A.14 Insufficient Disk Space Notice



If you see this notice, you will need to free up sufficient disk space before imaging starts.

Problems and Solutions

The following tables list possible problems and their solution that you might encounter in the use of the GeneTitan Instrument.

Table A.1 lists common power problems and possible solutions.

Table A.1 Common Power Problems and Possible Solutions

Problem	Probable Cause	Possible Solutions
The instrument cannot be powered up or does not start up properly.	**Cause 1** Power has been disconnected.	▪ Check the connections to facility power and UPS power. Confirm that they are secure. ▪ Shut down and restart the application. ▪ Shut down and restart the computer. ▪ Shut down and restart the Imaging Device by unplugging and reconnecting the power cord on the back of the unit **Do not use the power switch located on the front of the Imaging Device.** ▪ Shut down and restart the Fluidics by unplugging and reconnecting the power cord on the back of the unit.
	Cause 2 USB cables are unplugged or plugged into wrong USB port or USB memory stick placed on system by user	▪ Exit the application. ▪ Properly eject any user-inserted memory stick that may have been inserted into the computer's USB ports. ▪ Confirm that the USB connections to the labeled USB ports for the Imaging Device Fluidics and UPS are correct. ▪ USB connections should be to the correct (labeled) USB port (the ports cannot be moved). ▪ Verify drive G: is connected and the directory, G:\tasks appears in windows explorer. ▪ Verify drive F: is connected and the directory F:\HT96 Fluidic Tasks appears in Windows explorer. ▪ Verify the Windows Control panel>Device manager>Ports lists COM3 COM4 and COM5 where COM4 and COM5 are listed as a “Prolific USB to Serial Comm Port”. If all three ports do not show up recheck USB connections. Close and re-open device manager to refresh the IO list when new connections are made. **DO NOT** reassign port addresses using device manager. Contact Affymetrix field service if connections are verified but the ports do not appear as indicated. ▪ Re-launch the user application.

Table A.2 shows possible problems dealing with the array plates. This includes what to do if a power failure or user initiated power shutdown leaves array plates in the instrument or if you have left a plate in the hybridization oven during the GeneTitan AGCC application startup.

Table A.2 Recovering Plates From The Instrument

Problem	Probable Cause	Solution
Array plates are trapped in the instrument.	Power loss or abnormal application exit for any reason leaves plates in the system.	1. Exit and restart the GeneTitan AGCC application. 2. Wait for flashing blue light on the confirmation button to stop and homing to complete. 3. Respond to dialog box prompts and/or questions about plate disposition that may occur before, during or after the stage homing sequence. 4. At the end of the startup/homing routine the instrument will return all plates to the front of the system unless the you select to leave a plate in the oven. When homing is complete run **Unload Plates** from the setup tab to remove plates from the system.
Plates are left in the hybridization oven during the GeneTitan AGCC application startup.	If a plate is in the oven the user is offered the option to remove the plate or leave it in the oven during application startup. In response to this prompt the user may choose to leave plate(s) in the oven during the program startup homing routine (allowing hyb to complete in the oven). The plate hyb time is no longer controlled by the software.	1. Wait until the hybridization procedure has completed then re-start the application. 2. This time select the option to remove the plate from the oven when the GeneTitan AGCC application prompts as part of the homing/startup routine. 3. You may restart the GeneTitan AGCC application at any time to remove the plate and move the hybridization to an offline oven to complete the hybridization process. 4. You may later resume the process by starting the plate in wash-scan mode (normal operation for offline hyb mode processing).

Table A.3 shows possible problems dealing with the buffer and DI water bottles.

Table A.3 Problems Related to Wash and Rinse Bottles

Problem	Probable Cause	Solution
GeneTitan AGCC application reports that bottle pressure is too low during a run or at startup.	Missing reagent bottle or bottle cap not secure.	1. Verify that all bottle caps are installed on the correct bottle and that they are snug. 2. Check that the facility CDA pressure is up and running. 3. Select **Retry** to continue processing or **Cancel** to abort the run.
GeneTitan AGCC application reports that the Prime has failed for Rinse, Buffer A or Buffer B	▪ Missing reagent bottle ▪ or cap not secure ▪ or low facility pressure ▪ or reagent bottle empty ▪ or clogged filter	1. Verify that all bottle caps are installed on the correct bottle and that they are snug. 2. Check facility CDA pressure is up and running. 3. Verify that the reagent bottle is not empty. 4. Replace the filter if all other options do not resolve the issue. 5. Select **Retry** to continue processing or **Cancel** to abort the run.

Error Messages

Table A.4 lists various error messages. Messages may occur as a result of normal operation of the GeneTitan system and are also used to report error conditions to the user. This document outlines the most common message boxes the user may encounter (normal operation as well as potential errors). Practical recovery methods are detailed were recovery is possible by the user.

Using AGCC E-mail Notification with GeneTitan MC Instrument

Mail notification:

Once you configure the e-mail with contact and notification information, the software sends the e-mail notification concurrently as the software displays the dialog box.

Message boxes that occur when the user is already present generally are not sent out through AGCC e-mail since the user is already present to be notified by a dialog box prompt. Messages that occur as a result of an error while processing on GeneTitan are usually sent out via e-mail configured through the AGCC e-mail configuration editor. Since the user is not likely present this is the best way to alert the user to a problem in a timely manner.

It is strongly urged that users keep at least one “on call” e-mail contact in the AGCC e-mail configuration editor to respond to an event requiring user intervention.

E-mail contact can include a cell phone to receive the e-mail as a text message (e.g., 4151234567@att.mms.txt).

Context Specific Messages

Context specific error messages exist in the software that will be tailored to an error condition occurring in specific process steps. It is not possible to list all possible combinations of events here.

In certain cases the error message will be shown to alert the user but the process may attempt to continue without waiting for acknowledgement. This is done to try to ensure that a condition occurring on one plate will not affect processing for other plates.

If the error requires a specific user response processing for all plates may suspend at the next logical “pause” point for each plate being processed.

Table A.4 GeneTitan Instrument Error Messages

Message	Meaning
MachineName: 3380-GT-J67FBK1 OSVersion: Microsoft Windows NT 5.1.2600 Service Pack 3 UserName: AFFXUser ProductName: HT96CC ProductVersion: 3.0.0.1212 Application launch: 9/3/2009 11:42:18 AM	Help About
Barcode DriveID SpaceReqGB FreeSpaceGB PlateState ScannerState 55009440812260205109O9 C:\ 19.2 199 Scan Running DriveID FreeSpaceGB FreeSpaceRemainingGB Status C:\ 199 179.8 DriveID FreeSpace (GB) FreeSpace (Number of Pegs) C 199 249 D 472 590 Disk space required for one peg = 0.8 GB	Disk Space Check
Connection error Error initializing hardware: No can bus found or an error initializing an amp was encountered. Check USB connections. Make sure drive F: has become visible before attempting to restart the application. The application must be exited and restarted when the problem is fixed. Possible cause: A fluidic system drawer/door is open or not completely closed and the switch on the left side of the drawer is not closed. If this is the case make sure the drawer is moved into the system and close the drawer completely. If the system state is such that the gripper is actively holding the door open you will not be able to push the drawer in. In this case you will need to hold the switch closed while the application starts up to allow the homing procedure to complete. If the problem cannot be resolved as outlined above contact Affymetrix Field Support.	Error initializing hardware Symptom: The system gives a warning that there was an error initializing the hardware when the GeneTitan application starts up. The following message will appear (note: formatting of this message produces a message box larger than the screen and will be corrected in a future release). Other more specific error messages will normally present after this general error message. They are for field service reference if the solution listed below is unable to resolve the startup issue. Likely cause: USB disconnected no power or a safety mechanism (front panel door switch open or trash bin missing Solution: □ Make sure all USB connections are made between the scanner fluidic system computer and UPS power backup. □ Remove any external USB memory drives that are not normally connected to the system. □ Reboot the computer. □ Log into the AffxUser account. □ If the trash bin has been removed from the system replace it into its normal location. □ If a drawer is visibly open before GeneTitan starts up hold the switch on the left side of the drawer down while starting GeneTitan.
Error initializing amp: Y on node 25 System.Runtime.InteropServices.COMException (0x80004005): The referenced object has not been initialized at CMLCOMLib.AmpObjClass.ReInit() at IOPanel.AffyMotor.Init() Error on axis: Y	Stage initialization error messages All or some of these messages may appear after the "error initializing hardware" message box. They can usually be cleared following the instructions above. If not cleared using the steps outlined above then these messages may be used by service personnel to diagnose a specific subsystem malfunction. The amplifier/motor encountering the error may be any one of the fluidic system motion components: X Y Z Unclamp station Wash B lid or Gripper.
Error initializing amp: Z on node 26 System.Runtime.InteropServices.COMException (0x80004005): The referenced object has not been initialized at CMLCOMLib.AmpObjClass.ReInit() at IOPanel.AffyMotor.Init() Error on axis: Z	
Error initializing amp: Gripper on node 27 System.Runtime.InteropServices.COMException (0x80004005): The referenced object has not been initialized at CMLCOMLib.AmpObjClass.ReInit() at IOPanel.AffyMotor.Init() Error on axis: Gripper	
Error initializing amp: Unclamp on node 21 System.Runtime.InteropServices.COMException (0x80004005): Timeout waiting on SDO at CMLCOMLib.AmpObjClass.ReInit() at IOPanel.AffyMotor.Init() Error on axis: Unclamp	

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Digital IO failure event occurred at: 9/2/2009 12:10:29 PM Error on BeckhoffIO iomodule.Initialize() for node 9 GeneTitan must be restarted after exiting by using Windows Task Manager. All motors and DIO taken offline. System.Runtime.InteropServices.COMException (0x80004005): Timeout at CMLCOMLib.IIOObjClass.IIOObj2_Initialize(canOpenObj canOpenObj, Int16 nodeID) at IOPanel.BeckhoffIOModule.Init()	Digital IO Initialization error messages This message may appear after the "error initializing hardware" message box. It can usually be cleared following the instructions above. If not cleared using the steps outlined above then this message may be used by service personnel to diagnose a specific subsystem malfunction. If this message appears by itself without any of the other stage initialization errors being displayed then there may be a problem with the digital IO.
Temperature controller failed to initialize on COM port: COM3	Temperature Controller failed to Initialize This message may appear after the "error initializing hardware" message box. It can usually be cleared following the instructions above. If this message appears by itself without any of the other stage initialization errors being displayed then there may be a problem with the temperature controller com port. If this is the case contact Affymetrix field support.
Oven location 1 has a part: UnidentifiedPlate Current oven temperature is 34.2C Set point is: 38C Heater output enabled is: True The target recovery position for the plate is on drawer 1 at position HybOL_HtaHyb_DOWN(left side) You may choose to leave the plate in the oven or move it to the recovery location Do you want to leave the plate in the oven?	Plate detected in oven during system startup Symptom: The system gives a warning that there was an error initializing the hardware when a plate is detected in the oven at startup. This may occur if the user used task manager to kill the GeneTitan application or the computer lost power during process execution. The message will display the plate number (if known) and current oven settings. A target "place" location is shown where the plate will be moved to when the user selects NO to the prompt "Do you want to leave the plate in the oven. If there are 2 plates in the oven the process described here will be performed for each plate. Solution 1 (select Yes): □ Select "Yes" if you are not ready to deal with the circumstances that caused the malfunction or if you have no offline oven to complete the hyb. The oven is the safest place to leave a plate while waiting to move on to fluidic processing. □ If the oven output is enabled the set point will be used to bring the oven back into range. □ Note that if the oven itself did not lose power it will normally retain all settings and temperature control would have been maintained even while the computer lost power from rebooting. □ If the oven lost power then when power is restored the oven will automatically start to restore the settings displayed by this message even if the GeneTitan application is not launched. □ When the problem that caused the interruption is resolved restart GeneTitan and this time select No.
	Solution 2 (select No): □ Select "No" to remove the plate from the oven after the full hyb time is completed or for removal to an offline oven. □ Make sure the plate is finishing hybing for the full hyb time before continuing the process using Wash-Scan mode operation.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
There are plate(s) in the oven that can be recovered after drawer 1 output positions are cleared. Do you want to open drawer 1 to remove those plates now? (This will allow plate(s) in the oven to be recovered)	Plate detected in oven during system startup If the system has a plate on drawer 1 during this recovery the user will be prompted to remove the plate before the recovery can proceed. The following message is displayed. If no is selected the plate will not be removed from the oven. If Yes is selected the drawer will open for plate removal before proceeding to unload the plate from the oven.
Remove plate(s) from drawer 1	If Yes is selected then drawer will be opened and the following message will be displayed. Remove all plates from drawer 1 and select OK to resume recovery of the plate in the oven to drawer 1. Once the plate is on drawer 1 use the normal Unload operation to unload the plate.
Plate present in Scanner but not removed because Right side of drawer 2 is not empty. Please remove plate on right side of drawer 2 Drawer 2 will open for plate removal	Scanner drawer needs to be cleared at startup If a plate is detected in the scanner at startup the system will move the plates from the scanner to drawer 2. If the required position on drawer 2 is not available then the user will be prompted to clear drawer 2 with the following messages.
Please remove plate on right side of drawer 2. Press the OK button when done.	
WashB is currently filled with: BUFFERB_TO_WASHB WashB temperature set point is: 39C: WashB current temperature is: 27.7C Was a plate process interrupted or aborted that you intend to resume using this current fill? The setpoint will be reset when you resume the run and will be based on the fluidic protocol selected. Selecting NO will drain the current fill. If you do not intend to resume an interrupted run immediately select NO. If you select YES the system will maintain the temperature at this setting until the fluidic protocol resets the it.	Resume option for filled Wash A or Wash B detected at startup. In a case where the system may have been interrupted abruptly there may be Wash B or Wash A filled already when the system starts up. The Wash B may already be at the process temperature and draining would cause a process delay. As an aid to resuming the operation as fast as possible the user is provided the option to retain the current fills when the system starts up. If you do not intend to resume the run immediately select No so the indicated reservoir will be drained. If restarting the run be sure there is sufficient reagent in each bottle since this draining operation means the reagent will need to refill for the current operation. This message and option to drain will be presented again when the run is restarted or resumed. It only makes sense to select YES if you will restart the run immediately either in either Wash-Scan or Wash-Scan-Resume mode operation. If a Hyb-Wash-Scan is started as the next operation any “saved” reagent in the Wash A or Wash B reservoir will be disposed of since HWS starts a new run.
The Lamp Life Remaining is less than 60 hours. Lamp Life Remaining is 59 hours. Using the lamp beyond the recommended time period will result in poor quality data. Please exit the program and replace the lamp now. If you have replaced the lamp, please reset the counter for lamp life remaining. Press OK to reset the counter for lamp life remaining. Press Cancel to skip reset.	Lamp life remaining less than 60 hours This message will be displayed when the lamp life is expiring. Click OK if you changed the lamp prior to starting GeneTitan. This will reset the lamp life counter. Click cancel if you have not replaced the lamp.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Error processing: 5500321212121212 while trying to process fluidic macro: FillWashB Event detected at: 9/8/2009 4:55:45 PM A possible leak has been detected and valve power is disabled through a hardware interlock. Software control of the valve system has been disabled. Sensor S9 located on the bottom/left side of the system has either detected a leak, is unpowered or requires adjustment. Correct the problem before continuing. Select Retry to continue processing after the problem is resolved or Cancel to abort the process.	Leak Detected Leak checks are performed at application startup and any time a fluidic process (priming filling draining etc.) is performed. The leak detection is a hard wired sensor which will shut off fluid flow without software control. Leaks are normally confined to the drip pan located inside the system. Causes: □ System malfunction □ User killing the application using task manager during a fill operation resulting in application exit without stopping flow. Solution: Contact Affymetrix field support. The system cannot be used for any fluidic processing until this is resolved.
You are about to close the Application. Press OK button to close Application. Press Cancel button to cancel closing.	Normal exit If the user attempts to exit GeneTitan when no processes are running the normal application exit message will be displayed:
Cannot close Application. The System is busy. Please wait till processing is complete or abort processing before closing Application.	Exit while processes running If the user attempts to exit GeneTitan when processes are running the user is prevented from exiting. Before attempting to exit the running processes should be aborted using the STOP button.
Cannot shut down system. The System is busy. Please wait till processing is complete or abort processing before shutting down the system.	Running shutdown The shutdown menu available from the tools menu drop down explains the special steps it will take before closing the application.
Shutdown will do the following: Turnoff Hyb Oven heater. Turnoff WashB heater. Depressurize bottles. Turnoff Scanner. Close this application. OK to shutdown system. Cancel to cancel shutdown system.	Shutdown while processes running If the user attempts to shut down GeneTitan when processes are running the user is prevented from exiting. Before attempting to exit the running processes should be aborted using the STOP button.
HT96CC is closing because:	4.5Abnormal application exit If the application exits unexpectedly but in a controlled manner the reason for the exit will be included in the message below. Typically this message will be oriented to a software developer and not be GeneTitan application specific. If this happens get a screen capture of the message box and note the circumstances leading up to the event. Report the failure to Affymetrix field service. Note: reason will appear in the message box Solution: □ Reboot the computer □ Launch GeneTitan □ Perform appropriate resume and recovery operations as required. oHyb can be completed off line or by restarting GeneTitan and choosing to leave the plate in the oven. oFluidic process can be resume using Wash-Scan-Resume mode operation.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Move failed for reason: Timeout or error occurred on Amp.WaitMoveDone[15000] for axis: Gripper System.Runtime.InteropServices.COMException (0x80004005): The amplifier detected an under voltage condition at CMLCOMLib.AmpObjClass.WaitMoveDone(Int32 timeout) at IOPanel.AffyMotor.WaitMoveDone(Int32 timeoutMS, StringBuilder error) Axis: Gripper Error: TIMEOUT on MoveToAbsolutePosition command to location: 90 (Gripper) Move started at: 9/2/2009 12:22:48 PM Move ended in error at: 9/2/2009 12:22:48 PM Error on MoveToAbsolutePosition command to location: 90 (Gripper) System.Runtime.InteropServices.COMException (0x80004005): The amplifier detected an under voltage condition at CMLCOMLib.AmpObjClass.Enable() at IOPanel.AffyMotor.DoTheActualAbsoluteMove(Double AbsolutePos, Int32 timeoutMS, Logger Log, Boolean_ok, StringBuilder_e Stage error on axis: Gripper Possible causes/solutions: Drawer not closed during move - verify all drawers are closed Trash bin missing or improperly placed - verify trash bin is properly seated Improper placement or orientation of input trays - correct tray placement Equipment malfunction - contact Affymetrix Field Application Support if unable to resolve	Motion / movement error Movement that cannot be completed is reported as an error. Many things can cause a motion error and may be resolved to continue the run. Possible causes and solutions are listed below: Cause: Drawer opened by user and safety switch stops motion. Solution: Close the fluidic system front panel drawer and select retry. □ Cause: Trash bin is not positioned properly □ Solution: Verify the trash bin is seated and select retry. □ Cause: Wrong tray type or wrong orientation. □ Solution: Select Cancel and/or use the STOP button to abort the plate and restart the run. □ Cause: System malfunction due to improper plate placement or gripper mishandling. □ Solution: In some circumstances GeneTitan will continue to process by trying to automatically re-home the motion system. Follow on-screen prompts which may lead you to unload plates as part of the recovery process. If the machine cannot clear the error automatically exit and re-launch GeneTitan. If the "homing" operation done at system startup does not clear the error contact Affymetrix Field Service.
Error processing: SystemTask while trying to process fluidic macro: WaitUntilPressurizationComplete Event detected at: 9/2/2009 2:14:42 PM Bottle pressure too low or intermittent. Check that all bottles are securely connected. Correct the problem before continuing. Select Retry to continue processing after the problem is resolved or Cancel to abort the process.	Fluidic system error messages Fluidic system error messages may occur for many reasons ranging from user induced to sensor malfunction or facility supply line problems. Depending on the type of error and where in the process the error occurred the system may not stop processing until the error is corrected. Some errors are simply reported in a message box but the process continues. In such cases the purpose of the message box is to inform the user of an abnormal event. The event should be investigated after the plates running on the system are finished running. 6.1Bottle pressure too low Symptom: Message box similar to that shown here is displayed. If you choose to Cancel the fluidic process being performed will stop but you may still need to abort the overall plate process using the STOP button (or Cancel button during a plate setup operation). Solution: □ Verify facility line pressure into the system is ON. □ Verify all bottle caps are secure and that no bottle cap is crimping a supply line. □ Do not refill bottles or empty waste except when prompted to by the GeneTitan application.
Plate: SystemTask Time: 9/2/2009 2:16:21 PM Unable to achieve vacuum. vac start:14:15:50.2812500 end:14:16:20.4375000 Check CDA (house) pressure and bottle caps are firmly attached.	Vacuum failure Symptom: Message box similar to that shown here is displayed. If you choose to Abort the fluidic process being performed will stop but you may still need to abort the overall plate process using the STOP button (or Cancel button during a plate setup operation). Solution: □ Verify facility line pressure into the system is ON. □ Verify all bottle caps are secure and that no bottle cap is crimping a supply line. □ Do not refill bottles or empty waste except when prompted to by the GeneTitan application.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
TIMEOUT (ms=22000 waiting for sensor ON: S5WashA_BFDOverflow Continuing due to time critical nature of the process. Fill cannot be guaranteed FillUntilSensorState Failure on valve group BUFFERA_TO_WASHA Plate: 550032XXXXXXXXXXXXXXXX Time: 9/2/2009 2:22:16 PM Fluidic process: FillWashA Possible causes for dispense failure include: Bottle empty or fluid level too low. (Replenish bottle) Bottle cap not secure. (Check all bottle caps are secure) Clogged filter. (Replace filter); Continuing due to time critical nature of the process. Fill cannot be guaranteed. Underfill was likely.	Timeout waiting for fill During processing in the fluidic system the process does not stop if a timeout occurs while trying to fill a wash reservoir. In this case the timeout means the sensor that should have detected reagent flowing in the overflow drain did not turn on and stay on long enough. The error will be reported similar to the message below. The message(s) typically come in two separate boxes. Solution: □ Ensure there is sufficient reagent loaded when the run is started. □ Verify facility line pressure into the system is ON. □ Verify all bottle caps are secure and that no bottle cap is crimping a supply line. □ Do not refill bottles or empty waste except when prompted to by the GeneTitan application. □ Contact Affymetrix Field Service to have the sensor adjusted or replaced if the problem persists even after correcting for the usual causes outlined above.
Plate: 550032-plate1XXXXXXXX Time: 9/4/2009 4:54:53 PM RINSE_TO_WASHA sensor S5WashA_BFDOverflow time remaining is abnormally short. Maximum time remaining limit for fill is 17 seconds. Recorded time remaining is: 19.796seconds Fill may not have occurred or a previous drain may not have completely drained. Contact Affymetrix field support to determine if service may be required. Possible causes: - Bottle cap removed while previous drain was in progress. - Sensor may need adjustment. Sensor: S5WashA_BFDOverflow Process is continuing with this event noted.	Abnormally fast fill During processing in the fluidic system the process does not stop if an abnormally fast fill occurs while filling a wash reservoir. Abnormally fast means the sensor detected the reservoir as being full in an impossibly short period of time starting from when the reagent flow to the reservoir was initiated. When this happens the result is that the reservoir is under-filled and that particular process step is a likely cause of plate failure. An error similar to the message below will be reported. This message is an indication a previous drain was incomplete or that a sensor is malfunctioning or out of adjustment. The problem is usually intermittent and the plate currently running may complete without additional problems. Do not start any additional plates on the system until the problem has been addressed. Solution: □ Allow the current plate to finish processing if no other system is available. □ Contact Affymetrix Field Service to have the sensor adjusted or replaced. □ Do not start any new plates until the problem is resolved.
Warning: Scanner already launched. Click OK to relaunch (Recommended). Click Cancel to skip relaunch (For debugger use only).	Imaging system (scanner) error messages Scanner re-launch option The production release code should never provide the option seen below which allows the user to skip re-launching the application during application launch. This is available only in development. If seen outside development contact Affymetrix field service to verify proper installation of the current production released AGCC software which includes GeneTitan.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Error: ScannerApp launch timeout. Scanner is disabled. Please exit program and resolve the Scanner problem. If you choose to continue with Scanner disabled, this will allow you to remove plates in the system. But processing involving scanning will be aborted in the scan step.	Scanner launch timeout If the following message is received hyb and fluidic operations will be enabled but plates will stop processing without going into the scanner. Solutions: □ Exit GeneTitan. □ Verify all cable connections including USB and fire wire between the scanner and the computer. It is critical that the USB cable is inserted into the proper (labeled) location on the computer. □ Unplug the scanner wait 10 seconds and plug the scanner back in. □ Reboot the computer. □ Wait for the USB drive in the scanner to become visible (G: drive). If the G: drive does not become visible in Explorer contact Affymetrix Field Service to correct the configuration problem. □ Restart GeneTitan
Scanner error detected, scanner relaunched but failed. You have the following options: 1. Retry: resolve the problem and press the Retry button. If retry is successful, there is no interruption to the workflow. 2. Cancel: Abort the current plate and put the scanner offline... a. You have to wait till the gripper is available to remove the current plate. b. Processing of plates already loaded in the system will continue. But plates that require scanning will be aborted at the scanning step. You have to wait till the gripper is available to remove the plate. 15:43:40.4218750	Scanner re-launch failure If a scanner failure is detected the scanner application is "killed" and re-launched. If it still fails then the use has an opportunity to be informed and correct the problem and then press "Retry". If the problem cannot be corrected the scanner is placed offline. Any plate currently in the scanner will stay in the scanner until GeneTitan can be re-launched to again. Any plates moving through the system will automatically be "aborted" after fluidic processing completes (they will not attempt to move into the scanner.
Error: Cannot relaunch ScannerApp. Plate detected in scanner handoff. 550001123456789012345 Please resolve the problem before retry.	Plate detected in scanner handoff If GeneTitan cannot clear a plate detected in the scanner handoff the scanner application cannot be started. Solution: □ Re-launch GeneTitan □ If the problem persists contact Affymetrix Field Service."
Are you sure?	Processing plates Aborting a run confirmation When the user selects a plate to abort from the STOP button the following confirmation is presented.
The system is running on battery. Plate processing is not supported.	Running on battery / unable to start process When the GeneTitan system detects that it is running on battery this indicates that the facility power is currently down. If the user attempts to start a run the following message will appear. Solution: □ Verify the UPS has not been accidentally unplugged from the facility power □ Wait for the power out condition to end. When the UPS is once again "online" the run can be started.
Please register array plate by scanning the barcode or Type in the barcode.	Plate registration missing bar code When starting a new process setup the barcode must be entered. If the user fails to enter the barcode (either by using the hand held bar code reader or typing it in) the user will be prompted to register the plate with the following message.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Instrument cannot read barcode. Do you want to Retry? Yes: Reload ArrayPlate-Tray combo with correct orientation and retry reading barcode. No: Use barcode in textbox (scanned with external barcode reader or entered manually.	HTA plate barcode read error Unreadable bar code After the HTA plate has been loaded into the system the Fluidic system tries to read the plate bar code using its internal bar code reader. This is to verify that the correct plate was loaded and that the plate was loaded in the correct orientation. If the bar code read by the system does not exactly match the bar code entered by the user the following message is displayed. It is also displayed if the bar code is unreadable by the system. Solution: □ If you are certain that correct plate was loaded in the correct orientation select "No". The system will continue processing using the bar code you typed (or scanned with the external bar code reader). □ If you are unsure that you loaded the correct plate in the correct orientation select "Yes" to retry loading the plate. If No is selected the selected the user is given the following message to acknowledge that the barcode being used was provided by the user (not verified by the internal bar code reader). Setup will continue when the user selects OK.
Warning: Barcode in textbox used: 550001123456789012345	
Cannot proceed because: Part number from Barcode read by instrument is different from one registered. Part number from Barcode read by intrument: 550001 Part number from Barcode registration: 550002 Please redo setup and register with the correct barcode.	Different bar code If the GeneTitan system successfully reads a bar code and it does not match the bar code entered by the user the system will force you to reload the plate. The following message is displayed.
Barcode for this plate is already used by the plate in the system. Please setup again with the correct barcode.	Duplicate bar code If the barcode being set up matches any actively running plate in the system the user must re-enter a barcode that is not already in use. The following message is displayed.
Cannot find the protocol file for the entered barcode Please make sure the protocol files are properly installed and/or Re-register array plate by scanning the barcode or Type in the barcode.	Missing library and/or protocol files If any of the prompts shown below appear then a library file for the product is either not installed or missing some components. Solution: □ Use the Library file installer available via the Affymetrix Launcher to load the library files required for the product you are running. □ Re-launch GeneTitan after installing the library files.
550001.protocol does not exist. Barcode or Protocol file selection may be incorrect.	
Media file: C:\Command_Console\Library\550032.med does not exist. Barcode may be incorrect. Please resolve the problem before pressing Retry. Press Cancel to exit Setup.	
Error: GetMediaFilePath failed MediaFilePath = Media File for barcode 550032test1XXXXXXXXXX does not exist. Possible causes: Incorrect barcode. Incorrect library installation. Incorrect Command Console installation. Please resolve the problem and retry setup again.	
Array file: arrayFileName does not exist. Barcode may be incorrect. Please resolve the problem before pressing Retry. Press Cancel to exit Setup.	
Please select Setup Option.	

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Unable to verify tray type using the tray barcode. Verify orientation and that the tray type loaded is a scan tray. Press Ok or the flashing blue Confirmation button when ready.	Barcode read failure for scan stain or hyb tray During the reagent load steps (plate setup) each reagent tray has a bar code which is read by the system to verify the correct tray type is loaded and that it has been loaded in the correct orientation. The bar code does not verify tray content. It is up to the user to ensure the correct reagent is loaded into the tray at each step. The verification is repeated every time the drawer is closed whether it is a load or an unload operation. Normally the bar code is read and no message is displayed to the user. If the bar code is unreadable or not present the drawer opens and the user is prompted to verify the tray type and orientation. No matter what process is being run the drawer close procedure expects the following trays: □ Drawer 2 scan trays only □ Drawer 3 4 and 5 stain trays only (may contain stain fixing ligation or other reagents) □ Drawer 6 blue cover on left side and hyb tray (if any plate is present) on right side. The drawer close verification does NOT check the HTA plate bar code. That check is done at a higher level in the GeneTitan application software. The drawer close verification is not context sensitive. It doesn't know what should be loaded on a specific drawer (left or right). It does know that if any tray is present it should be the correct type. Verify Scan Tray Load for drawer 2 Cause: Scan tray bar code not detected Solution: □ Be sure to verify plate type is a scan tray □ Verify correct orientation before pressing Ok.
	When Ok is selected the system will continue processing without re-verifying the barcode. This will allow processing to continue in the case where the barcode is unreadable or not present. Be sure to verify plate orientation before pressing Ok.
Unable to verify tray type using the tray barcode. Verify orientation and that the tray type loaded is a stain tray. Refer to the System Setup tab / System Layout for tray content. Press Ok or the flashing blue Confirmation button when ready.	Verify Stain Tray Load for drawer 3 4 or 5 Cause: Stain tray bar code not detected Solution: □ Be sure to verify plate type is a stain tray □ Verify correct orientation before pressing Ok. When Ok is selected the system will continue processing without re-verifying the barcode. This will allow processing to continue in the case where the barcode is unreadable or not present. Be sure to verify plate orientation before pressing Ok.
Unable to verify orientation and tray type using the tray barcode. Verify left side is a blue cover (and HTA if required) Verify right side is a hyb tray (if required). If you are performing an unload step remove the plate. Press Ok or the flashing blue Confirmation button when ready.	Verify drawer 6 load Cause: Hyb tray bar code not detected or a wrong tray placed where the blue cover should reside on the left side. Solution: □ Be sure to verify plate type is a hyb tray on the right (is required for the current process). □ Verify correct orientation before pressing Ok. When Ok is selected the system will continue processing without re-verifying the barcode. This will allow processing to continue in the case where the barcode is unreadable or not present. Be sure to verify plate orientation before pressing Ok.
Verify plate clamping is secure. Press Ok or the blue Confirmation button when ready.	Verify Clamping After clamping the HTA plate to the sample (HYB) tray for Hyb-Wash-Scan mode operation the drawer is moved out for inspection to verify the clamping is secure. When the drawer is closed again the bar code of the hyb tray is verified again (see section 8.6 Barcode read failure for scan stain or hyb tray) to verify the user has not replaced the tray in the wrong orientation.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Warning: Failed to set WashB target temperature or process aborted by user. If you did not abort the process, please resolve problem and retry.	Setup failure or abort during WASHB preheat Failure or user abort during a setup preheating operation will result in the following message to inform the user. Solution: If the user did not abort the preheating step then reset the system: □ Exit the GeneTitan application □ Disconnect power from the fluidic system for 10 seconds □ Reconnect power and wait 30 seconds □ Reboot the computer □ Launch GeneTitan □ Continue processing. If the problem persists contact Affymetrix Field Service.
An Unexpected plate is detected on Left side of drawer. Please remove the plate.	Error during plate unloading Unexpected plate detected The user placed a plate on the drawer or failed to remove the plate during an unload step. Solution: remove the requested plate and select OK.
'ou removed the plate on Left side of drawer. Please put the plate back.	Unexpected plate or tray removal The user removed a plate (or tray) required by some other plate process during an unload step. The wrong plate was probably removed (left vs. right side). Solution: Return the plate (or tray) that was accidentally removed to its proper location and orientation. If the tray had a cover when it was removed it should continue have a cover. If the system had already removed the cover return the tray to the system without a cover. Note: this may be left or right side
An error occurred during plate loading: Setup has to be aborted.	Error during plate loading An error caused by improper loading of plates or a motion system error may cause the plate loading process to exit setup and display the following error message. Solution: □ Perform a new setup being careful to load the proper plates and in the correct orientation. □ If restarting setup does not clear the problem re-launch the GeneTitan application. Contact Affymetrix field service if the problem persists even after re-launch.
You have not selected any array to scan. Please select arrays to scan.	No arrays selected for scan When running a Hyb-Wash-Scan Wash-Scan Wash-Scan-Resume or Scan at least 1 array must be selected for scan. If no arrays are selected when the user selects "Next" the following message is displayed. The user can continue the array selection process after selecting "OK".

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
Do you want to load another plate in the Left Position. Please press the Yes button to confirm. Cancel setup another run: Are you sure? All open drawers will be closed.	Reagent loading workflow prompts Loading another plate for a workflow Some products including Axiom have a reagent load step which occurs at the end of the hyb (reagent trays are not loaded when the HTA plate is loaded into the system). After loading all reagent trays the user will be asked if they want to load another plate to start hyb before the fluidic process starts up for a plate which is about to come out of the hyb oven. If the user intends to process 2 plates per day for a workflow sustained through the week then the response must be "Yes". The "Left" or "Right" refers to the drawer 2 location which will be allocated to the scan tray and hyb output (sample) tray. If two plates are already in the oven then the "side" will be the same as the side of the plate that is ending hyb now. In other situations the side may change to whichever side is available based on plates running in the system at the time. While setting up the run for the new plate if the user selects "Cancel" in the setup tab the following message is displayed. "Cancel setup another run" refers to the new plate being set up not the original plate that is still waiting to come out of hyb when the process is resumed.
This will resume the Hyb-Wash-Scan in the Left Position. Please press the OK button to confirm.	No do not load another plate If "No" is selected then the message shown below is displayed to confirm the original plate coming out of hyb will continue processing. Note: this may be left or right side (position) Selecting cancel at this prompt will abort the plate from the hyb oven and bring it out to drawer 1 for unloading.
This will resume the Hyb-Wash-Scan in the Left Position and This will start another plate with Hyb-Wash-Scan run mode in the Right Position. Please press the OK button to confirm. Cancel resume setup: Are you sure? All open drawers will be closed.	Yes load another plate If "Yes" is selected the user will be prompted to load the new plate and sample on drawer 6. Then the message shown below is displayed to confirm the original plate coming out of hyb will continue processing along with the new plate that was just loaded into the system. If the user selects "Cancel" the following confirmation message is displayed.
Please remove any Trays loaded for Setup Another Run. Make sure on Left Drawer there is a Blue Tray bottom WITHOUT cover or ArrayPlate on top. Press OK when done.	Canceling setup leaving the blue tray Canceling during setup while other plates are still running will prompt the user to remove their sample tray and HTA plate. It is essential that the user leave a blue cover in place on the left side of drawer 6. This will be used by other plates waiting to be processed in the system.
AGCCEmailConfigurationEditor already running	AGCC interface E-mail configuration editor already running If this message is displayed locate the currently running configuration editor on the Windows task bar. Only one instance of the application can be run at a time.
Error: Cannot find AGCCEmailConfigurationEditor.exe	Cannot find e-mail application If this message is displayed the AGCC installation may be corrupt. AGCC Command Console should be re-installed.
Error: Command Console not installed properly. Failed at GetLibraryPaths. Please exit Application and resolve problem before relaunching this Application.	Command Console not installed properly If this message is displayed the AGCC installation may be corrupt. AGCC Command Console should be re-installed.

Table A.4 GeneTitan Instrument Error Messages (Continued)

Message	Meaning
To avoid potential damage to system: If the drawer is extended, Please remove any tray on the drawer. Press OK button when done.	Unsupported configurations The messages below should not be encountered in the field. If they are there is a configuration problem with the system. If any of the following messages appear do not attempt to use your system. Contact Affymetrix field support. Unload Tray from Scanner Cause: This message is encountered if the fluidic system is not properly configured in the system or if the scanner does not have a GeneTitan system attached. Solution: Remove any plates from the scanner arm before selecting OK. If this is field installed contact Affymetrix field service to correct the configuration before continuing to use the system.
Warning: This is for debug use only. You should not use this version for real plates.	For debug use only If this message is displayed the AGCC installation is not a production released software. AGCC Command Console should be re-installed.

GeneTitan® Instrument Recovery Procedure

The intent of the recovery procedure is to save the array plate, array plate process and the instrument when a power interruption (power blackout or emergency shutdown, or the user cycle the power of the instrument) occurs or if the workstation and application unexpectedly freezes during the operation. The instrument software performs the appropriate recovery procedure based on the condition of the process when the event occurred.

Recovering the Instrument from a Power Interruption

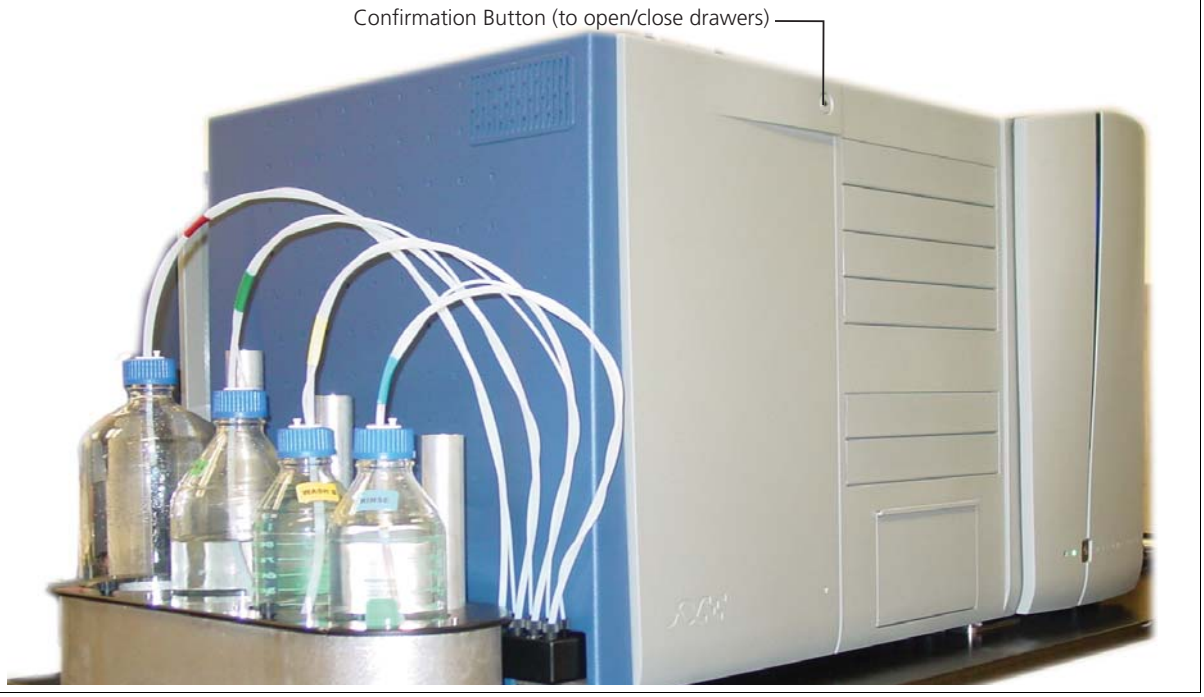
Recovering the Process After a User Power Interruption

If you cycle the power of the instrument, the GeneTitan Instrument can recover itself from its last position whenever you restore the power to the instrument and only when you initiate another run. This means that the GeneTitan Instrument will automatically home all stages in the instrument without any hardware crashes or damage regardless of the positions of the stages at the time of the power interruption. If the power interruption occurs while the plate gripper is handling the array plate, the instrument can home all of its stages without any damage to the array plate.

Procedure for Recovering a Process

1. Resume power.
2. Initiate another run. For this procedure, see the *Affymetrix® GeneChip® Command Console™ User's Guide* (P/N 702569).
   - The plate confirmation button light (Figure B.1) will flash blue while the system homes.

Figure B.1 The Confirmation Button



3. The flashing plate confirmation button light will stop. If required, the AGCC application will prompt you to remove the plates. Follow the unload plate procedure in the AGCC application.

Recovering the Process After a Power Failure

The intent of this recovery procedure is to recover the array plate from the instrument which experiences a process interruption in the event of a facility power failure during operation. If required, the AGCC application will prompt you to following certain procedures.

Saving the Process

You can resume the process at certain process steps. The integrated UPS allows you to perform an appropriate recovery procedure to recover the array plate at the following process steps:

- At the Hybridization step

  The instrument removes the array plate from the oven and places it on Drawer #1. Plates remain in the drawers available for the user to initiate an unload process from the setup tab.,
- At the Wash-Stain step

  The instrument unloads the array plate to its scan tray. Plates remain in the drawers available for the user to initiate an unload process from the setup tab.
- At the Scan step

  The instrument aborts the scan. The scanner unloads the array plate and transfers the array plate into the GeneTitan Instrument where they remain in the drawers available for the user to initiate an unload process from the setup tab.

If the GeneTitan Instrument was processing two array plates during a power failure, the instrument performs the combination of all three procedures above to recover all the array plates from the instrument.

IMPORTANT: If you cannot restore power to the GeneTitan Instrument, a trained service technician must manually recover the array plate. This recovery procedure may require the disassembly of the instrument such as the front or side panel to gain access to the instrument.

Resuming the Process

If you were able to recover the array plate at the hybridization or scan process steps, the software will allow you to continue to process the array plate using the modes of operation specified in the section *Processing an Array Plate*, in the *Affymetrix® GeneTitan® Instrument User Guide* (P/N 08-0296).

IMPORTANT: If you recovered the array plate at the Wash-Stain process steps, you cannot resume the Wash-Stain process at the step where the power failure occurred.

UPS Low Battery Condition

During a run, if the UPS internal battery falls below 50% charge, any running processes are automatically aborted and the instrument moves the plates to the front of the system to wait for you to come and deal with the situation (unload the plates and continue elsewhere).

If an array plate/hyb tray combo is in the hybridization oven, the instrument moves it to the output location in drawer 1 (position left or right). You will normally remove the plate to an offline hybridization oven and, after hybridization, return the plate to the instrument and resume the run on the instrument using the wash-scan mode of operation on the GeneTitan system.

If the array plate is not attached to the hybridization tray, the plate is in a wash stain process, and the instrument has removed the scan tray and stain tray. If you initiate an abort or if a power outage (with the UPS battery dropping below 50%) is detected, then the instrument moves the array plate to the scan tray.

IMPORTANT: The system does not have any resume capability from this condition.

If the plate was in a final wash A, it is then possible for you to resume the run using the scan mode only. You will need to use your judgement on this as to whether it is worth continuing the run.

The 50% charge required on the battery is a configured setting and may change to a higher or lower setting in the future. You might just refer to that level as the minimum allowed UPS battery charge (which just happens to be 50% in this release).

Resuming the Process from a Workstation or Application Freeze

If the workstation has locked up, you must reboot the workstation. If the application has crashed you must relaunch the AGCC application. Neither of these actions will cause the instrument to home all the stages. These stages shall remain in the same positions as before the reboot or the relaunch. Follow these procedures.

1. If the scanner freezes during the scanning of an array plate, reboot the Affymetrix GeneChip Command Control (AGCC) application. After the application has opened, you may initiate a scan of the unscanned wells.
2. If the scanner freezes when the scanner is scanning an array plate while the GeneTitan Instrument is processing another plate.
   - **A.** If the other plate is in a fluidic process:
     - **1)** Wait until the GeneTitan Instrument completes the wash and stain protocol on the other plate (and ready to scan).
     - **2)** Reboot the GeneTitan AGCC application.
     - **3)** Unload plates.
     - **4)** Reload and scan both plates following the scan mode procedure.
   - **B.** If the other plate is undergoing hybridization:
     - **1)** Reboot and relaunch the AGCC application to force the instrument to unload the plate from the oven and to transfer it to Drawer #1,
     - **2)** Unload the hybridizing plate and finish hybridization offline.
     - **3)** Unload and reload the plate that was in the scanner and scan the remaining wells.

     IMPORTANT: **Relaunching AGCC will cause the scanner plate to eject back onto the drawer location from which it originated.**
3. If the workstation or application freezes while the GeneTitan Instrument is processing an array plate in the wash and stain procedure, reboot the workstation and relaunch the AGCC application.
4. If the workstation or application freezes while one or two array plates are hybridizing in the oven, the power to the controller will continue to maintain the oven temperature. Reboot the workstation or AGCC application. The software will offer the option of leaving the plates in the oven or removing them for offline hybridization. If you elect to leave the plate in the oven you will need to remove the plates at a later time by again relaunching the AGCC application or by removing the plates manually through the front of the system. You can then resume the plate processing using wash-scan mode.

Shutting Down

You should perform the shutdown protocol at the end of a session. Do not keep the GeneTitan Instrument on if you will not use it again within the next 12 hours. This will reduce the risk of salt buildup in the instrument.

The fluidics automatically performs a cleanout protocol.

IMPORTANT: **To avoid contamination, the DI water should be replaced with fresh DI water before performing a fluidics run.**